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A Fulbrighter Reports

Atwood Hudson

As Fulbright Lecturer in Speech Pathology, the writer was assigned to the Department of Pediatrics of the Medical School, University of Oslo, for the academic year 1953-54. The Department of Pediatrics is housed in Barneklinikken (Children's Hospital) and is under the direction of Professor of Pediatrics, Dr. Leif Salomonsen. The Children's Hospital in Oslo, like a similar one in Bergen, is a modern, well-equipped hospital; both were peace gifts of Sweden to Norway following the Second World War. Under the general supervision of Professor Salomonsen, the speech pathologist worked in close association with Dr. Marit Skatvedt, medical specialist in cerebral palsy. The Speech Clinic had been organized and equipped the previous year by Dr. Mildred Freburg Berry of Rockford College, the first Fulbright appointee to be awarded a foreign lectureship in Speech Pathology.

The duties of the speech pathologist fell into four general categories: (1) Lecturing in Speech Pathology; (2) Clinical practice with hospitalized cerebral palsied children and with certain selected out-patients; (3) Training clinical assistants in the techniques of speech correction for very young children; and (4) Directing and supervising speech therapy at outlying cerebral palsy centers.

Atwood Hudson (Ph.D., University of Wisconsin, 1952) is Associate Professor of Speech and Director of the Speech Clinic at Rockford College, Rockford, Illinois.

Lectures

A series of 24 lectures was initiated in September, 1953, and terminated at the beginning of the Christmas holiday. Each lecture was two hours in length; they were held twice a week. The instruction was conducted in English, the custom with Fulbright lecturers in Norway.

In general the subject matter of the lectures was devoted to a consideration of the speech problems of young children whose disorders of speech were organic in etiology. This plan of instruction was designed to supplement the program of speech correction in Norway where the current practice was to offer therapy only to children who were over seven years of age. At the same time, an attempt was made to offer basic instruction in speech pathology for those who had previously prepared in other disciplines such as medicine, psychology, physical and occupational therapy, teaching of the mentally handicapped, etc.

Although the major stress was given to the communication problems of the cerebral palsied, the speech and language needs of those afflicted by cleft palate, loss of hearing, asphasia, etc. were included. In every instance, the discussion of theory was followed by a consideration of appropriate therapies. Slides, photographs, films, and demonstrations of clinical cases were utilized. Among the hospitalized cerebral palsied children were almost classic cases of athetosis, spasticity,

ataxia, and rigidity. Demonstration with these children proved to be most effective in illustration of the communication problems of the cerebral palsied and, furthermore, provided for observation of suitable and effective therapies for both group and individual speech and language needs.

A selected library of books, pamphlets, articles, recordings, educational toys, and other teaching materials was set up in a convenient room in the hospital for the use of the individuals following the course. Attendance at the lectures ranged from 30 to 80 individuals; 30 people followed the entire series of 24 two hour lectures.

A short course of six lectures was held in March, 1954, at the Medical School in Bergen, under the direction of Professor of Pediatrics, Dr. Alfred Sundal.

In addition to the regularly scheduled series of lectures at the Medical Schools of Oslo and Bergen, there were occasions for addressing special groups. Among the latter were the Medical Associations of Oslo and Bergen, the American Woman's Club of Oslo, the Physical Therapists Association, the faculty and students of the Norwegian school for the training of speech correctionists, the Cerebral Palsy Association of Norway, the Red Cross committee responsibile for children's programs, and the Sanitetsforening (women's civic organization of Norway). In Denmark, the writer addressed the Cerebral Palsy Association of Denmark at a meeting held at the University of Copenhagen. In Sweden, two lectures were given in response to an invitation from Professor of Pediatrics, Dr. Bo Vahlquist, at the Medical School, University of Upsala.

Clinical Practice

A regular weekly schedule of therapy was followed. The majority of the children had cerebral palsy; others had problems resulting from cleft palate; some had hearing losses; others were aphasic. Whatever the etiology might be, all these children had serious problems of speech and of language. The cerebral palsied children who were hospitalized had daily therapy. Those who attended the hospital nursery school for the cerebral palsied received therapy twice a week. Other children who were out-patients came in for regular appointments at the Speech Clinic. Cerebral palsied children who lived in distant parts of Norway were brought to Oslo by their parents for re-evaluation by the medical staff. These children were given daily therapy in the Speech Clinic and by the physical therapists for a period of two weeks. The mothers attended each therapy session and received suggestions and materials for use at home.

Another feature of the clinical schedule was diagnosis. Since every pediatrician on the staff at the Children's Hospital followed the practice of consulting the speech pathologist when a child had a speech or language problem, there was a necessity for maintaining a flexible program which could be adjusted at short notice to provide for a diagnostic session. In every case, a written report was submitted to the pediatrician.

Thirty hours a week were devoted to clinical practice. Visitors from England, Holland, Denmark, Sweden, and many from Norway observed the activities of the Speech Clinic.

There were many applicants for clinical training. Those individuals

who seemed best qualified from previous training, who were following the lecture course, and who could be fitted into the time limitations of the schedule were selected. During the nine months, 18 assistants were given regular appointments to study testing procedures, to learn the selection and preparation of materials, and to assist in therapy. These individuals had supervised clinical practice ranging from 30 hours in some cases to over 200 hours in others. The young woman employed by the Red Cross to carry on the services of the Speech Clinic received over 500 hours of clinical practice.

Out-Lying Cerebral Palsy Centers

The cerebral palsy center at Tomtebo was visited once each month. The speech pathologist accompanied Dr. Marit Skatvedt, medical specialist in cerebral palsy, on the monthly visits which entailed leaving Oslo by train on Friday afternoons and returning on Saturday evenings. Each child was examined by the speech pathologist and the doctor, with the physical and occupational therapists in attendance. The two therapists attended the lectures in Oslo although it meant a journey of 120 miles each time.

The speech problems of each child were determined and therapeutic procedures were suggested. The physical therapist carried out the therapy assisted by the occupational therapist. On ensuing visits, progress was tested and additional suggestions were made for correction of speech problems or for the development of language.

The center at Valstadbraaten, an hour's ride from Oslo by bus, was also visited each month. Dr. Bjarne Andersen, of Ulleval Hospital in Oslo, was the medical specialist at this center. Because of the large number of children, it was not practicable for the speech pathologist and the physician to examine the children together, although the initial examinations were made by both specialists. The physical therapist at this center also followed the lectures in Oslo; to her fell the responsibility for carrying out the recommended therapy.

It should be reported that the plan of having the physical therapists administer speech therapy under the supervision of the speech pathologist was not an ideal plan, but it appeared to be the best way to meet the pressing needs of the children until additional speech therapists could be trained. In actual practice, the two physical therapists at these centers achieved remarkable success in dealing with the speech and language problems of the children. Evidence of the success of this plan was presented to the officers of the Cerebral Palsy Association and to the medical specialists by clinical demonstrations in late May.

Conclusion

The Children's Hospitals in Oslo and in Bergen provided modern, excellently-equipped lecture rooms complete with screens and projectors for slides and films. Treatment rooms which were attractive and conveniently located were available. As part of the 'state hospital system' of Norway, these hospitals offered the speech pathologist an enviable opportunity to observe medical examinations, to evaluate the speech needs and, in many instances, to administer therapy to children with almost every type of serious, organic speech disorder. This opportunity, in addition to the close association with various medical specialists, served to enrich the ex-

perience of the speech pathologist. Furthermore, it served to define the place of speech pathology in the field of social pediatrics.

The program in speech pathology enjoyed the enthusiastic support of the personnel of the United States Educational Foundation in Norway, of the officers of the Cerebral Palsy Association, of Professor Salomonsen in Oslo and Professor Sundal in Bergen, and of the staff of doctors at both hospitals. The chance to live and work in Norway provided opportunities not only for personal service but for professional growth. But most important of all, perhaps, was the inspiration which came from knowing a people so devoted as the Norwegians to democratic ideals.

The Significance Of Early Orthodontia In Cleft Palate Habilitative Planning

J. Daniel Subtelny

The child with a cleft lip and palate frequently presents a characteristically deformed oral cavity. This deformity has been thoroughly described previously (*5*, 7). It is reasonable to assume that the defects within the oral cavity constitute a serious threat to the development of intelligible speech. Evidence from the sound spectrograph shows a 'loss of consonant boundaries in cleft palate nasalized speech' (3). This and other recent investigations (*10*, *11*) suggest that the malfunction in cleft palate speech is not limited to the velopharyngeal area.

With this in mind, it seemed advisable to explain the contribution that the orthodontist can make toward improving the configuration of the oral cavity, and indirectly, the speech potential of cleft palate children. An effort has been made to show why orthodontia is necessary, when it should begin, and what can be expected in terms of total cleft palate habilitation.

Oral Anatomy

The infant with a cleft of the lip and palate develops with the same potential for a specific facial and maxillary arch configuration as the so-called normal child. However, superimposed on this potential are the consequences of a congenital cleft of the lip and palate. The relationships which result directly from the cleft lip and palate require special attention and analysis.

The fundamental orthodontic problem evident in the pre-school child with a repaired cleft lip and palate is a constriction of the maxillary arch (Figure 1). The dental arch does not exhibit the smooth, gradual curvature that one usually sees; the maxillary segments frequently appear flattened and obliquely distorted toward the midline. The anterior regions of the maxillary arch appear abnormally narrow; at the same time the transverse width of the palate seems greatly reduced. The teeth in the line of the cleft may be malposed. The maxillary posterior teeth may be lingual to the corresponding mandibular teeth. Frequently, the upper anterior teeth are found to be in a retruded relationship to the lower anterior teeth.

It has been substantiated that a complete cleft of the lip and palate is manifested as early as 2 to 3 months of prenatal life (*1*). Thereafter, the musculature of the cleft lip develops and functions around an aberrant skeletal foundation. The cleft musculature not only acts in a disproportionate and nonsymmetrical fashion on the unfused maxillary structures,

J. Daniel Subtelny (D.D.S., University of Pennsylvania, 1947; M.S., University of Illinois, 1953) is Senior Assistant Dental Surgeon, National Institute of Dental Research, National Institutes of Health, United States Public Health Service. This article is based on studies performed at the Cleft Palate Center, University of Illinois and on a paper presented at the Seventh Annual Speech and Hearing Conference, Pennsylvania State University, June 23, 1954.

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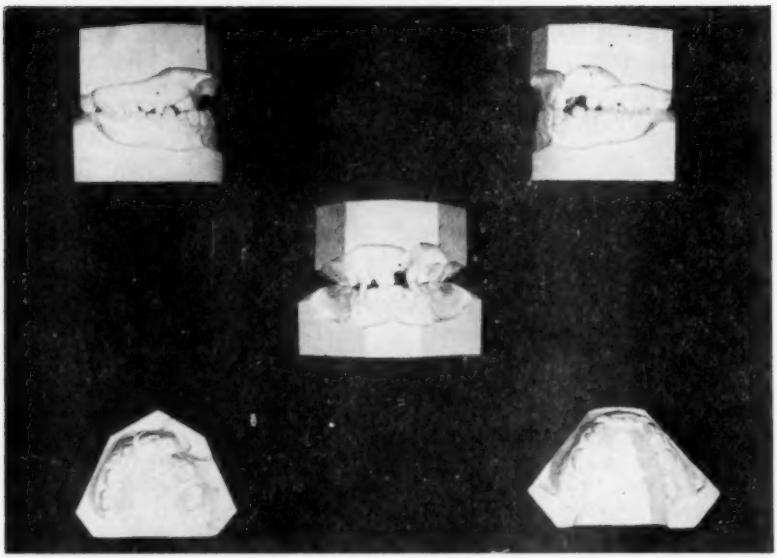

FIGURE 1. Cast reproductions of the oral cavity of a child with a surgically repaired unilateral cleft of the lip and palate. Note the constricted maxillary arch and the narrow palatal width (lower left); the lingual relationship of the maxillary posterior teeth to corresponding mandibular teeth (center) and the retruded relationship, antero-posteriorly, of the maxillary dentition to the mandibular dentition (upper figures).

but in addition, is unable to restrain the expansive forces of the muscular tongue. This disturbance of normal muscular balance and function results in the upward and outward positioning of the alveolar segments evident at birth (Figure 2).

Surgical correction of the cleft lip frequently changes the relationship of the alveolar segments. The plastic surgeon usually detaches the lip musculature from its underlying bony structures as far posteriorly as the tuberosity of the maxilla (Figure 3). Superiorly, he closely approaches the lower border of the bony orbit. The resulting relaxation of the lip segments facilitates the surgical union of these segments. However, upon healing, the reconstructed lip creates pressures on the alveolar segments and initiates a molding influence.

Pruzansky (*12*) has demonstrated the effects of this molding action. It may bring about an approximation of the alveolar segments anteriorly (Figure 4) and frequently, it may be of sufficient strength to over-rotate the maxillary alveolar segments medially. The latter observation is exemplified by the case of a complete unilateral cleft of the lip and palate seen in Figure 5. The medial over-rotation has caused the alveolar process of the smaller maxillary segment to become contained within the premaxillary alveolar element of the larger segment. At the same time it has caused a nar-

rowing of the palatal cleft in more posterior regions as well as a constricted maxillary arch.

Thus, as a result of lip surgery alone, the alveolar process of the smaller maxillary segment may have been moved by muscular forces into a lingual relationship with the corresponding mandibular segment. It has been contended that this maxillary constriction is due entirely to the mal-effects of surgery on the palate. It is true that even after judicious palatal surgery has been performed, the formation of some cicatricious tissue may create or aggravate a constricted condition. However, it is important to recognize that the constriction of the maxillary arch is frequently present before the initial surgical treatment of the palate.

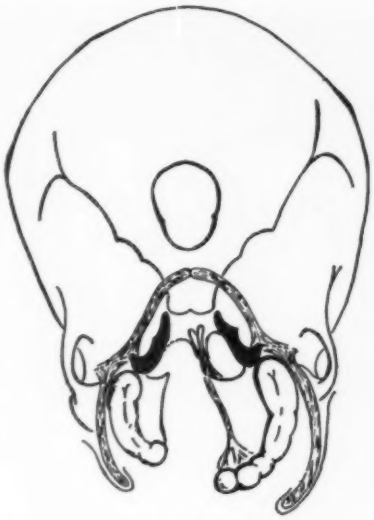

FIGURE 3. Drawing of the inferior view of a skull illustrating the surgical detachment of the lip and buccal musculature from its underlying bony structures. The musculature is detached as far posteriorly as the maxillary tuberosities prior to surgical closure of the cleft lip.

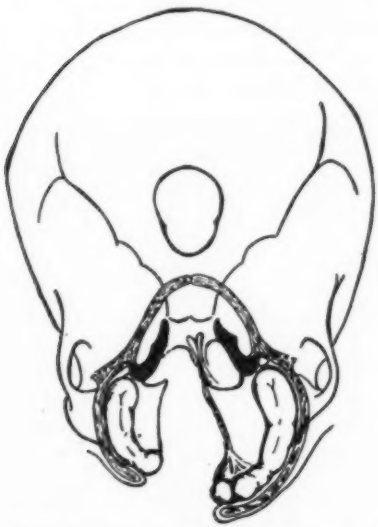

FIGURE 2. Drawing of the inferior view of a skull illustrating the outward positioning of the maxillary alveolar segments. Note that the occurrence of a cleft lip and palate results in a loss of the continuity of the outer muscular ring composed of the buccinator and the superior constrictor pharyngis muscles.

Indications that the effects of lip surgery on the unfused maxillae were not restricted to a constriction of the maxillary arch were acquired through laminagraphy (*4*), a body sectioning x-ray technique. This technique makes it possible to visualize contiguous structures.

Laminagraphic x-ray records on 12 children with a cleft lip and palate were obtained prior to and 3 months subsequent to surgical reconstruction of the lip. The 3-month interval represents a rapid growth period in infants and consequently there was considerable increase in many dimensions of the head. However, in ten of the twelve cases the distance between the

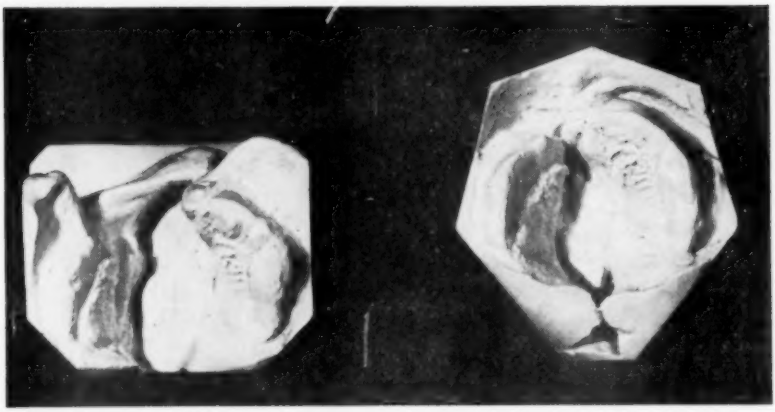

FIGURE 4. Plaster cast reproductions illustrating the molding action of the reconstructed lip and an approximation of the alveolar segments anteriorly. (Courtesy of Dr. S. Pruzansky, The Cleft Palate Center, University of Illinois.)

outer-most margins of the nasal cavity had remained the same or decreased (Figure 6). Two other infants with clefts of the lip and no disturbance in the continuity of the palate did not exhibit similar results. The distance between the lateral margins of the nasal cavity had increased with growth. Thus it is evident that in the infant with a cleft of the lip and palate, the molding action of the lip is not restricted to alveolar bone alone, but may cause an architectural rearrangement involving each maxilla. In many of the cases demonstrating this movement, the maxillary constriction was severe enough to bring about contact between the inferior nasal turbinate and the nasal septum. This may offer a possible explanation for the distorted nasal speech sounds of cleft palate speakers noted by several investigators. It has been described as a hyponasality superimposed on the hypernasal quality.

The Correction of Malposed Relationships

It is apparent that the initial phase of orthodontic therapy in cleft lip and palate cases must be directed toward the counteraction of the adverse muscular influences. The alveolar segments must be repositioned in order to establish a more normal form to the maxillary arch. Whereas the post-operative muscular influences constricted the maxillary arch and its supporting bone, orthodontic forces must expand the maxillary arch and its supporting bone.

Expansive orthodontic forces affect some individuals with cleft lip and palate differently than they do non-cleft individuals. Ordinarily, orthodontic treatment in the non-cleft patient involves the movement of individual teeth and the somewhat plastic alveolar bone immediately surrounding these teeth. In these instances the orthodonist gradually

moves the teeth to a position where they will not only improve the appearance of a child, but will also permit better masticatory function. On the other hand, there are indications that the same forces, applied in a child with a cleft lip and palate, may actually move the two segments of the maxilla (*9*). In these cases actual tooth movement is minimal; the entire maxillary bone housing these teeth appears to be repositioned.

These reported differences in orthodontic expansion were studied utilizing frontal cephalometric laminagraphy (*14*). Eight cases were examined radiographically. This sample included six patients with a surgically repaired unilateral cleft of the lip and palate and two controls. Of the two controls, one was a noncleft patient and the other a patient with a completely intact alveolar process, but with a surgically repaired cleft extending partially into the posterior border of the hard palate.

Laminagrams were taken prior to orthodontic expansion and were compared with those taken at the termination of the expansion phase of therapy. The distance between crowns of developing teeth, still entirely embedded within bone, were measured.

An appreciable increase in the width dimension between these unerupted teeth was demonstrated (Figure 7) in children with a surgically repaired cleft of the lip and palate. This indicated that not the teeth, but the bones encompassing them were repositioned. In addition, there were striking changes in the nasal cavity. Following orthodontic expansion, the turbinate was no longer in contact with the nasal septum and there apparently was improved ventilation on that side of the nose (Figure 7).

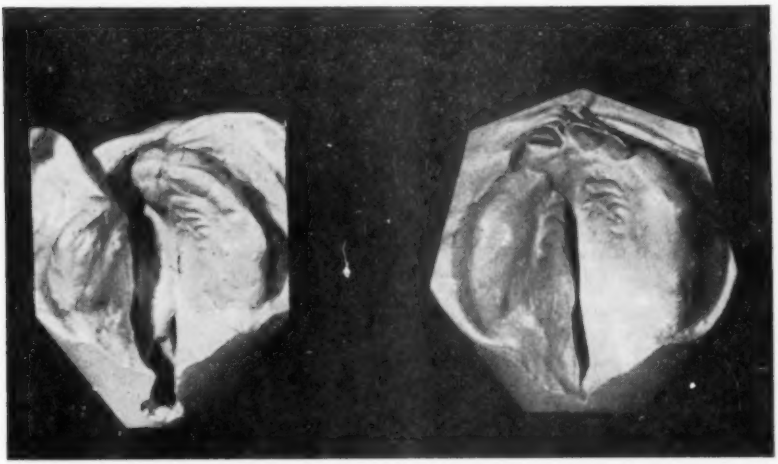

FIGURE 5. Plaster cast reproductions illustrating the molding action of the reconstructed lip and a medial displacement of the maxillary segments. Note the containment of the alveolar process of the smaller maxillary segment within the premaxillary alveolar element of the larger segment. (Courtesy of Dr. S. Pruzansky, The Cleft Palate Center, University of Illinois.)

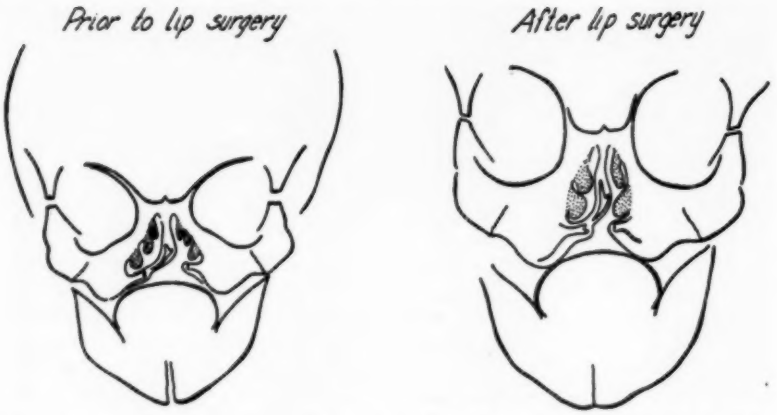

FIGURE 6. Tracings of laminagraph X-rays depicting changes in the configuration of the nasal cavity resulting from surgical reconstruction of the cleft lip as well as growth. A 3 month time interval has elapsed between the first and second X-ray.

The opening of the nasal cavity was most marked anteriorly.

Similar results of expansive forces were not seen in either of the controls. There was no apparent change in the configuration of the nasal cavity nor in the distance between unerupted teeth (Figure 8). However, the distances between the crowns of erupted teeth affected by orthodontic pressures changed materially. This indicated that in the controls there was no change in maxillary position or in the bony framework exclusive of the alveolar process.

In the cleft lip and palate individuals, the expansive phase of therapy was rapidly carried to completion at younger age levels. Frequently this phase was completed within a 2 to 3 month period. In these youngsters, there was considerable evidence for the repositioning of the bony maxillary segments. This has been clinically observed by a number of writers and substantiates the importance of Grundt's (*8*) statement: 'It must be clearly understood that in small children (with complete clefts of the palate) the moving of the jaw itself is easier to achieve than the individual regulation of each tooth.' Perhaps this may account for the rapidity of movement.

Unquestionably, many important aspects of cleft palate orthodontia, such as the reorientation of the architectural anatomy of the maxillary arch and palate, may be accomplished rapidly and effectively at an early age. It is not necessary to wait until the conventional 11 to 12 years of age or adulthood. Moreover, with the following consideration of the advantages to be gained, the findings strongly emphasize that the optimal age for initiating orthodontia is a preschool age—as early as cooperation of the child and parents may be obtained.

The Advantages of Pre-School Orthodontic Treatment

Growth Implications. In order to justify early orthodontia, as well as

the added expense and effort involved, the advantages must be clearly defined and presented. Perhaps we may best be guided by Conroy's (*6*) statement: 'Orthodontic treatment should be undertaken at whatever age the growth and denture positions indicate that an improvement can be hoped for.'

By reconstructing the oral architecture and placing the segments in their proper location, the orthodontist provides the potential for more normal growth and development. An early establishment of more normal intermaxillary relationships frequently brings about an improvement of many conditions. The ventilation within the nasal cavity noticeably improves, the alveolar segments are unlocked and it can be assumed that the maxillae, relieved of their impaction, are able to grow more normally.

The significance of the containment of one alveolar segment within another, and the orthodontic unlocking of these alveolar segments cannot be overemphasized. It is in this area that the full implications of growth may be visualized. The containing segment acts to mechanically impede growth; one alveolar segment is buttressed against another. As a result there may be an accompanying sacrifice of alveolar growth. The deciduous teeth contained within the smaller segment, and in close proximity to the cleft, will frequently remain in a partially erupted or impacted state. If the adverse segmental

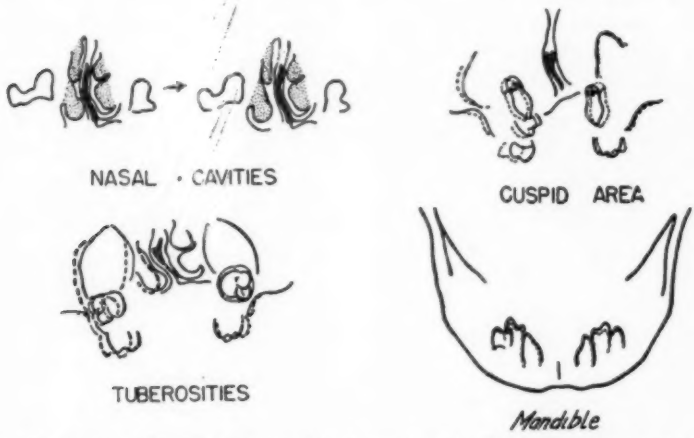

FIGURE 7. Tracings of frontal laminagraphic X-rays depicting the results of the orthodontic expansion in Figure 9.

Upper left: Improvement in the ventilation of the nasal cavity. Following expansion the inferior turbinate no longer contacts the nasal septum.

Upper right: Increase in the width dimension between unerupted teeth. The developing maxillary cuspids are still completely embedded in bone. The position of these teeth prior to expansion is denoted by the solid line and after orthodontic expansion by the broken line. The same is true, in this case, of the developing maxillary second permanent molars (lower left).

Lower right: Superimposed sections of the mandible to illustrate that the aforementioned changes are not a result of growth.

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relationships are allowed to remain, this condition will ultimately become evident in the permanent dentition.

When orthodontic expansion is applied and the alveolar segments are unlocked, a rapid increase in alveolar growth is observed in freed areas, while the partially impacted teeth erupt fully and rapidly (Figure 9). It is important, therefore, that these segments be unlocked during the early stages of development when growth is most rapid. Advantage may then be taken of the greatest possible growth potential, from as early an age as possible.

This provision for fuller latent growth may vastly improve the potential for a more harmonious facial appearance. Early segmental repositioning creates a more normal foundation for the support of the reconstituted lip. It may be reasoned that with a greater expression of alveolar growth more alveolar bone can devolop to add to the support of this lip. Added bulk will help counteract adverse lip pressures and reduce a depression in the middle third of the face. Establishment of a more normal scaffolding for the roof of the mouth may produce more normal and symmetrical denture relationships to support the lip. In addition, the orthodontist may greatly diminish some of the physiologic limitations of his service involving the secondary dentition. By maintaining a good geometrical relationship, he can greatly simplify the adolescent orthodontic

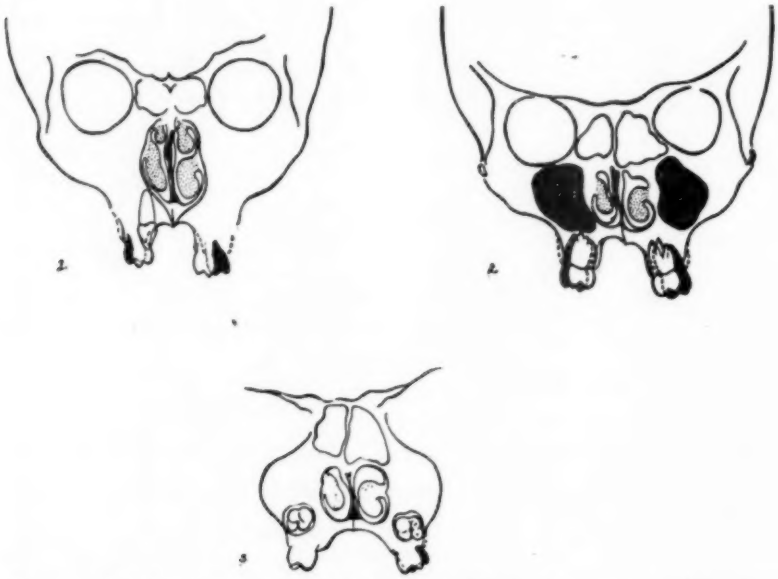
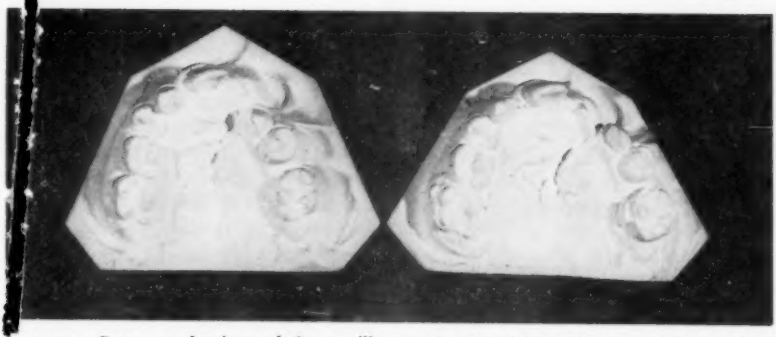


FIGURE 8. Superimposed tracings of laminagraphic X-rays taken on a non-cleft child before and after orthodontic expansion. There are no apparent changes in the configuration of the nasal cavity. Changes seem to be restricted to the erupted teeth (before—white; after—solid black) and the alveolar process (before—solid line; after—broken line).



IGURE 9. Cast reproductions of the maxillary arch of a child with a surgically repaired nilateral cleft of the lip and palate (Figure 1), both prior (left) and subsequent (right) o orthodontic expansion. Note the alleviation of the maxillary constriction and the estab-shment of a more normal arch contour.

problem in a child with a cleft of the lip and palate.

Speech Implications. If orthodontia is done early, during the period of rapid speech development, it will do the most good. The architectural makeup is brought closer to the normal. At the same time, it is brought closer to the normal at an early age, when basic speech habits are being rapidly established. This would seem to be of value in speech learning since it may reduce or prevent the development of the common misarticulations of a cleft palate child. In the past, the constriction of the maxillary arch has been recognized in cleft palate cases. Too often, this has been thought of only in terms of simple malocclusion. However, the distortion in vault architecture and its disproportionate size in reference to the tongue (Figure 10) constitutes a real threat to articulatory proficiency.

Speech pathologists have continually emphasized the importance of providing at an early age the means for normal vegetative and overlaid speech functions (*15*). This cannot be interpreted to involve merely a routine surgical or prosthetic correction of the palatal and velar defects, but rather, the means for establishing near-normal neuro-muscular patterns involving the entire speaking apparatus. The earlier the oral mechanism has achieved its potential for normalcy, the sooner the general tongue activity may more

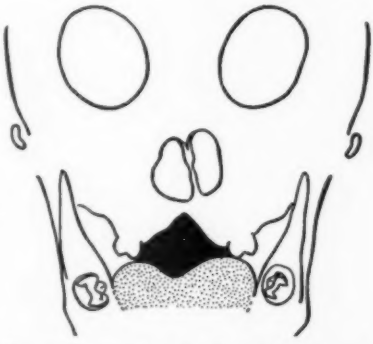


FIGURE 10. Tracing of a frontal laminagram of an adult subject with a repaired cleft of the lip and palate. The X-ray was taken while the patient was phonating the vowel 'ah.' The stippled area represents the tongue, while the black area represents oral cavity space. The constricted maxillary arch and the abnormal palatal contour is obvious.

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closely approximate normal function during mastication and speech. Compensatory adjustments of the tongue, dictated by abnormal oral configurations, may be avoided. The added potential for more normal growth enhances the possibility of a larger as well as a more normally contoured oral resonating cavity.

Furthermore, early orthodontia can expedite the placement of a prosthetic speech appliance in young children with clefts judged to be too wide for surgery or where the achievement of a good functional result by surgical means is doubtful. The prosthedontist is better equipped to meet the criterion of a good speech prosthesis if the optimal positional relationships of the maxillary segments are provided.

In older children, orthodontic therapy is frequently rejected because it imposes a costly delay before a speech prosthesis can be inserted. Unfortunately, poor segmental relationships are maintained. As a result, lingually positioned maxillary teeth and the added bulk of artificial denture materials may limit the extent of tongue elevation. Thus, the tongue must contend with a relatively low palatal vault as well as a constricted maxillary arch. It is hoped that in the future with more early orthodontia being performed, the 'either-or' decision in regard to prosthesis or orthodontia will seldom occur.

Contra-Indications to Early Oral Orthopedic Therapy

Clinically, a great deal of hesitancy has been expressed in beginning orthodontic treatment early. It may be wise to discuss some of the more fre-

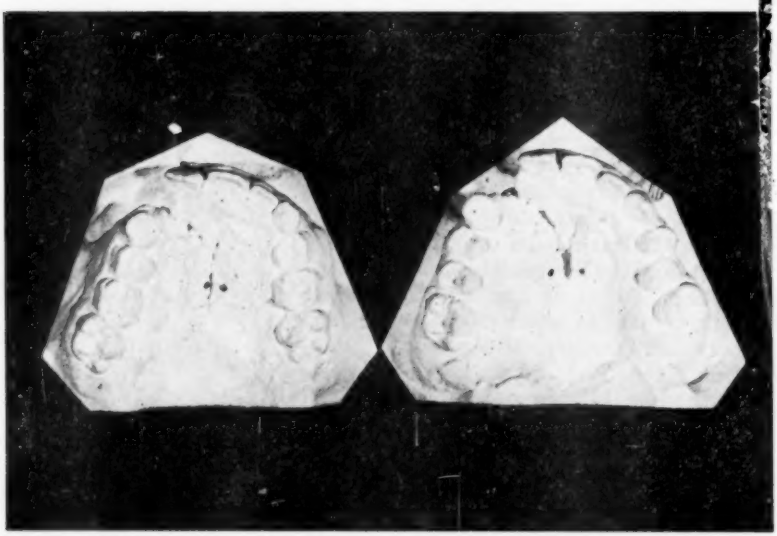

FIGURE 11. Cast reproductions of the maxillary arch of a child with a surgically repaired unilateral cleft of the lip and palate illustrating the opening of anterior spaces after orthodontic expansion. This tissue had not been surgically united prior to the application of orthodontic forces.

quently reported contra-indications.

The possibility of the surgically united palate reopening causes considerable apprehension. In rare instances there is opening of surgically united soft tissue as a result of orthodontic forces even though very judiciously applied. It must be stated that frequently there is no surgical union of the soft tissue in the more anterior regions of the hard palate. A medial displacement of the maxillary segments has been demonstrated. Not only may this result in a containment of one alveolar segment within another, but the smaller segment may approximate the palatal tissue of the other segment in the anterior regions. A non-united joint is created by soft tissue touching soft tissue. The surgeon is often unable to properly prepare this tissue for good surgical union without introducing extensive and possibly undesirable measures. Wisely, he surgically unites the soft tissue as far forward as possible without disturbing the area of soft tissue approximation. It is in this area that the unlocking of segments, by orthodontic forces, may result in the reopening of the non-united joint (Figure 11).

Considering the potential advantages for more normal cosmesis, alveolar growth, masticatory function and speech development, the reopening of anterior spaces does not seem to be serious. Retaining devices are necessary to maintain the orthodontic result. They may be constructed to serve the function of anterior obturation with equal efficacy.

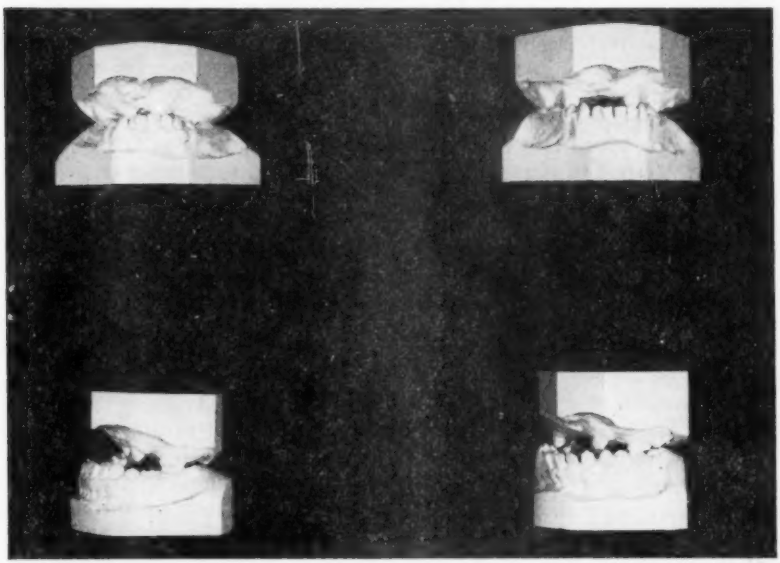

FIGURE 12. Improvement in the oral architecture as a result of orthodontic treatment despite the presence of a copious amount of cicatricous tissue. Left—before treatment; Right—after treatment. This should greatly facilitate the placement of a prosthetic appliance and improve tongue-palate relationships.

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It may also be mentioned that, where considerable cicatricous tissue is present, the inelasticity of this tissue has been considered dicta. This contention has not been corroborated by many orthodontists actively working with post surgical cleft cases (*13*). Its presence makes the problem more formidable and may limit the extent of treatment as well as prolong the time of treatment. However, some improvement in the oral architecture may still be hoped for and achieved (Figure 12).

Several periods of treatment may be necessary. The realization that the patient may still face the necessity of treatment involving the secondary dentition whether or not early orthodontia is carried out has caused many orthodontists to lose interest in early treatment. It is true that it may be impossible to achieve a perfect occlusion at an early age. Permanent teeth, especially those bordering the cleft, may still erupt in aberrant relationships requiring further orthodontic intervention. However, it is felt that the extent of orthodontic revision involving the secondary dentition can be greatly reduced if the proper preparation in 'geometric relationships' has preceded the adolescent or pre-adolescent age. Later treatment may thereby become more routine in nature—principally a realignment of malpositioned teeth.

Long periods of retention are inevitable. The physiologic constriction following lip surgery indicates the adjustability of the position of the maxillary segments which have failed to fuse embryologically. This relative degree of adjustability signifies that some form of prolonged retention is generally necessary because it is impossible to stabilize the adverse muscular influences. This is further corroborated by the observation that strong relapse tendencies, or an inclination to return to the initial constricted configuration, are evident in cleft cases following orthodontic treatment.

The necessity of prolonged retention does not present a difficult problem. Simple retentive appliances can be readily constructed and, if need be, rapidly replaced and altered. They can be fabricated so as not to interfere with growth or tongue activity while positional relationships are maintained. In addition, the retention appliance may be of value as a space maintaining device during the transitional periods when deciduous teeth are lost and replaced by permanent teeth.

Where an opening in the anterior regions of the palate occurs or any palatal opening is present, a thin smooth retainer covering the hard palate is recommended. This not only maintains good nasal hygiene, but prevents leakage of air which improves the efficiency of anterior valving and intra-oral pressure during speech. Anterior perforations may permit pneumatic leakage which can appreciably weaken certain speech sounds.

A child's speech prosthesis, if properly constructed after orthodontic treatment, can also serve as a palatal retainer. In addition, orthodontic bands utilized during treatment may be prepared to offer added retention to the speech appliance. Slight discrepancies remaining within the maxillary arch may be further corrected by simple orthodontic adjuncts to the prosthetic appliance.

Working with 'orally sensitized' patients at an early age is extremely difficult. From a psychological view-

point, this difficulty is not to be minimized. It should be mentioned, however, that many children 3 to 4 years of age have been treated prosthetically and orthodontically. In most instances it was possible to achieve good child-doctor relationships early in therapy. The long-term goals and principles of treatment must be carefully explained to the parents. Rapport with the child can be developed gradually after parental cooperation and understanding is assured.

In conclusion, any objection to early orthodontia is aptly answered by a statement made by Baker: (2) 'Any oral orthopedic intervention undertaken during the pre-school period to geometrically constitute an improved speech potential is not only justified but desirable.'

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APPLIED SCIENCE JUN 27 1955

Interpretations Of Facial Reactions To Stuttering

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Whenever the 'objective attitude' is taught in stuttering therapy, treatment is concerned in part with how the stutterer feels about listeners' reactions to his speech (*1, 3, 4*). Clinical experience suggests that the stutterer may tend to project his own unfavorable attitudes toward stuttering upon his listeners, seeing in their behavior exaggerated and distorted forms of his own malreactions. Van Riper (*4*) observes that the stutterer

> . . . dreads the anticipated rejections, the impatience, the embarrassment, or the laughter—all real or imaginary—of his listeners. He scrutinizes his prospective auditors for any sign of these penalties; he looks with preoccupied intensity for indications of resemblance to past situations in which he has suffered hurt. Even when the listener shows no reaction whatever, he imagines hidden rejections. He expects from all listeners the unpleasant responses he has received from a few. He interprets even acceptance as pity.

The purpose of this study was to examine certain aspects of the stutterer's response to listener behavior by objective methods. A motion picture was first made of a series of individuals while listening to stuttered speech. The film was then shown to stuttering and non-stuttering subjects in order to study their interpretations of the listeners' facial reactions. The procedure permitted answers to the following questions:

1. How closely did subjects agree among themselves in interpreting the reactions observed in the film?

2. To what extent did the stutterers' interpretations differ from those of the non-stutterers?

3. How accurately did the subjects' interpretations accord with the listeners' own reports of their reactions?

4. To what extent did the stutterers' interpretations correspond to their assumptions regarding listener reactions to their own stuttering?

Procedure

The Film. The subjects used in making the film were 10 Brooklyn College students, seven male and three female. They knew nothing in advance about the nature of the experiment except that they had been asked to serve as subjects, and they were unaware that they had been photographed until the study was completed. One additional participant was a severe stutterer, age 19, who did not appear in the film. The stutterer was acquainted with the purpose of the study, and was rehearsed in his part in the procedure.

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TABLE 1. Reactions reported by 10 college students immediately after listening to severe stuttering S—'slight,' D—'definite,' I—'intense.'

Reaction	*Listener* 1	2	3	4	5	6	7	8	9	10
No Unfavorable Reaction										
Embarrassment		S	S	S		D			D	
Amusement	S					S		S		D
Impatience		S	S	D		S			I	S
Pity		D		S		S	D			
Annoyance		S			S	D				
Superiority						S				
Shock						D			I	
Morbid Curiosity			I	S		I		S		
Studied Unconcern		S				D				
Any other										

The subjects were filmed one by one in a small sound-treated cubicle. One wall contained a glass panel through which a classroom was ordinarily visible. This window was entirely covered with black construction paper except for a small aperture through which the subjects could be observed and photographed from the other side. The cubicle was illuminated by three photographic floodlamps, one of which was placed next to the aperture where its glare helped to make the camera lens invisible. The classroom was completely darkened.

Each subject was conducted in turn into the cubicle and seated in a chair facing the stutterer so that a three-quarters view of the subject's face was obtained in the view finder of the camera. The two were then left alone, and the stutterer said, 'I'm going to ask you to put your age and sex on the back of a piece of paper that I'm going to give you.' As soon as the stutterer had begun to speak these words the camera recorded the listener's facial reactions for a period of approximately 15 seconds. The film was stopped in each case before the stutterer had finished speaking.[1] The result of this procedure was an eight mm. color film consisting of 10 portrait studies, each of which was later titled with a number.

After each subject had been photographed he received a questionnaire blank listing various reactions to stuttering. He was then conducted by one of the experimenters to another room where he was given the following instructions:

> You have just listened to the speech of a severe stutterer. We should like to know exactly how you felt as he was speaking to you. Most people feel somewhat disturbed in various ways when they listen to severe stuttering. In order to be of greater service to stutterers, it is important for us to know exactly what people think and feel when they listen to stuttered speech. You can be of assistance by indicating your reactions

[1]On the average, the stutterer required about 30 seconds to complete this sentence. This may be regarded as an essentially accurate reflection of the true severity of his stuttering in the situation. Nearly every word was stuttered. He had been instructed to fake stuttering when necessary to maintain a high level of severity, but later reported that very little of his difficulty was simulated.

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as honestly as possible. The stutterer who spoke to you will not see the blank which you will fill out. On the blank which you have been given, please check each reaction which you felt. Place your check in the appropriate column, indicating whether your reaction was slight, definite or intense. Be sure to check only those reactions which you had at the time you were listening to the stutterer. Do not check a reaction if you had it only afterwards. Please do not put your name on the blank.

The listeners' responses on this questionnaire are tabulated in Table 1.

The Experiment. The subjects viewing the film were 25 non-stutterers obtained from several introductory speech classes at Brooklyn College, and 25 stutterers attending the speech clinic. Both groups had a median age of 19 and consisted of 23 males and two females. All but two of the stutterers had recently entered the clinic and were essentially naive about the subject of listener reactions from a clinical viewpoint.

Both the stutterers and the non-stutterers were tested in small groups. At each experimental session the subjects received questionnaire blanks accompanied by the following instructions:

You are about to see brief motion picture studies of the facial expressions of a series of individuals. Each of these individuals was photographed, without his knowledge, *while being spoken to by a severe stutterer.* As you study each subject's face, try to form a judgment as to the manner in which he is reacting to the stutterer's speech. After each subject has been shown on the screen, you will be given ample time to check, in that subject's column, the kind of reaction to stuttering which you believe was apparent in his facial expression, or to check 'no unfavorable reaction.' Please check only one item for each subject, the one which seems to you to describe his reaction best.

After a brief period for questions about the instructions, the film was shown. The projection was interrupted after each face until all subjects had recorded their interpretations.

During or very shortly after enrollment in the speech clinic, each of the stutterers participating in the experiment had completed a questionnaire concerned with his interpretations of listener reactions to his own speech. The instructions which he had received were:

Please indicate by placing a check in the appropriate column how frequently people whom you do not know well

TABLE 2. Number of stutterers ascribing a given reaction to each of 10 persons filmed while listening to severe stuttering. Each of 25 stutterers chose the single item 'best describing' each face appearing in the film.

Reaction	*Listener* 1	2	3	4	5	6	7	8	9	10
No Unfavorable Reaction	7	2	1		9	4	3	1	5	
Embarrassment		4	3	5		1	5	11	1	
Amusement		10	14	20		17	5	4	7	21
Impatience	2					1	5	1	2	1
Pity	5	1	1		8		2	3	3	
Annoyance		2	1			1	3	2		
Superiority						1			1	1
Shock		1					1		2	
Morbid Curiosity		3	2		4			1	2	1
Studied Unconcern	10	1	3		4	1	2	2		
Any Other	1	1								1

TABLE 3. Number of non-stutterers selecting a given reaction for each of the 10 listeners. Total number of non-stutterers, 25.

Reaction	*Listener* 1	2	3	4	5	6	7	8	9	10
No Unfavorable Reaction	5	3			4	3	1		3	
Embarrassment		1	2	5		2	6	9	2	2
Amusement		16	6	16		8	4		8	18
Impatience	3		3		2	1		3		
Pity	5	1			8	1	2	4		
Annoyance			5		3		2	1		1
Superiority		1	7	3		7	4		5	3
Shock					2			1		
Morbid Curiosity	2	1	1	1	4	2	2	1	2	
Studied Unconcern	9	2	1		2	1	3	6	4	
Any Other	1						1		1	1

seem to exhibit each of the following reactions to your stuttering.

Each reaction could be checked in any one of five columns headed *never, occasionally, often, usually, always.* The reactions listed were the same ones appearing on the other questionnaires used in this study, as shown in the tables.

Results

In most instances both groups of subjects differed widely among themselves as to the term which best described the listener's facial reactions. Table 2 shows the number of stutterers who chose each of the 11 available interpretations for each of the 10 faces appearing on the screen. Faces 1, 2, 5, 7, 8 and 9 each failed to evoke agreement among a majority of the stutterers on any one interpretation. For faces 2, 3, 6, 7, 8 and 9, the stutterers' judgments were scattered among seven or more different interpretations in each case, although a majority concurred on faces 3 and 6. Only regarding the remaining two listeners, 4 and 10, was there essential

TABLE 4. Number of stutterers and non-stutterers selecting each of various reactions in response to the average listener.

Reaction	*Stutterers*	*Non-Stutterers*
No Unfavorable Reaction	3.2	1.9
Embarrassment	3.0	2.9
Amusement	9.8	7.6
Impatience	1.2	1.2
Pity	2.3	2.1
Annoyance	0.9	1.2
Superiority	0.3	3.0
Shock	0.4	0.3
Morbid Curiosity	1.3	1.6
Studied Unconcern	2.3	2.8
Any Other	0.3	0.4

agreement. In cases 5, 7 and 9 the difference of opinion among the stutterers was relatively complete. Table 3 shows a similar failure of agreement among the non-stutterers.

A general resemblance between Tables 2 and 3 is evident in the distributions of judgments for nearly every face. The similarity between stutterers' and non-stutterers' interpretations is seen more clearly, however, in Table 4, in which the comparison is summarized by showing the mean number of subjects in both groups who selected a given interpretation in the course of reacting to all 10 faces. The numbers will be found to correspond closely for each of the 11 possible interpretations, with perhaps two exceptions. The stutterers tended to observe *no unfavorable reaction* somewhat more frequently and *superiority* somewhat less frequently in the faces of the listeners than did the non-stutterers. Further study would be needed to establish that these minor differences are not due merely to chance. For the present, it is clear from the direction of these differences that the stutterers were not, at any rate, abnormally disposed to see unfavorable reactions in the listeners' faces by comparison with a group of normal speakers.

'Correctness' of Subjects' Interpretations. The interpretations offered by both groups of subjects tended to be markedly 'inaccurate' as judged by their failure to accord with the reactions admitted by the listeners themselves after being photographed. Each listener's own report of his reactions is summarized in Table 1. This may be compared with the stutterers' interpretations in Table 2. With the exception of listeners 6 and 10, the interpretation agreed upon by the largest number of stutterers in each case corresponded to none of the reactions reported by the listener. Only in the case of listener 10 was there definite correspondence of responses. In five cases (listeners 2, 3, 4, 5, 9) *amusement* was most frequently used by the stutterers to describe reactions for which the listeners themselves chose such terms as *pity*, *morbid curiosity*, *impatience*, *annoyance* and *shock*. In the case of listeners 1, 7 and 8, respectively, '*amusement*' was interpreted by the stutterers as *studied unconcern*, '*pity*' was interpreted as *embarrassment*, *amusement* or *impatience*, and '*amusement*' and '*morbid curiosity*' were most often interpreted as *embarrassment*. Substantially the same 'misinterpretations' were made by the non-stutterers, as may be seen from an examination of Table 3.

A reservation concerning the validity of these findings is that it is impossible to know with how much candor the listeners confided their reactions. All that one can say is that their questionnaire responses as shown in Table 1 give little evidence of a strong disposition to hide adverse reactions. None of the listeners claimed to have felt *no unfavorable reaction.*

Stutterers' Projections. For the purpose of this study, projection was defined as a stutterer's tendency to see unusually often in the film the same unfavorable reactions to stuttering which he had previously imputed to his own listeners. At the outset it was found that 16 of the 25 stutterers had seen no reactions in the film 'unusually often.' That is, they had offered no single interpretation with a frequency conspicuously greater than that for the stutterers as a group, which tended to be similar, in turn, to the group

tendency of the non-stutterers.[2] In these 16 cases the possibility of demonstrating projection as defined in this study was ruled out. Each of the remaining nine stutterers had offered a single interpretation repeatedly in viewing the film. The hypothesis to be tested in each case was that this corresponded to the stutterer's most frequent interpretation of listener reactions to his own speech as reported prior to the experiment. When their data were inspected from this point of view little was found to indicate such a relationship. In order to illustrate the nature of the data, the following cases are cited:

M. G., who noted *annoyance* in the faces of three photographed listeners, 'occasionally' sees this reaction in his own listeners.

A. C., who thought that seven faces in the film showed *amusement*, 'occasionally' finds this true of his own listeners. He also reports that his listeners 'usually' show *embarrassment*, yet found this evidenced by only one listener in the film. Another reaction 'often' apparent in his own listeners is *impatience*, but again he found this evidenced by only one photographed listener.

R. D., who believed that eight listeners in the photographic record showed *amusement*, finds this reaction expressed only 'occasionally' in the face of his own listeners. He is 'often' conscious of such other reactions as *impatience, pity, annoyance, shock* and *studied unconcern.* Yet, with the exception of *pity*, none of these reactions were apparent to him in the film.

L. S., who recorded six reactions of *amusement* in viewing the film, 'occasionally' finds this in response to his own stuttering. He feels that his listeners 'often' show *annoyance*, but saw *annoyance* in none of the photographed faces.

D. L. saw *pity* four times in the film, but had 'never' noted this as a reaction to his own speech.

D. T., who found seven listeners in the film who showed *amusement*, 'never' finds this true of his own listeners. He 'occasionally' sees *embarrassment, morbid curiosity* and *studied unconcern* as reactions to his own stuttering, but saw none of these in the photographic record.

Discussion

The outstanding findings in support of common clinical beliefs were the wide disagreement apparent in the stutterers' judgments and their failure to accord with the reactions professed by the listeners themselves. These results were, on the whole, to be expected. They tend to afford some objective evidence to justify training the stutterer to make qualified judgments based on unhurried, emotionally detached observations.

The remaining findings were not consistent with the hypotheses of this study. In general, the stutterers declined to 'project' into the film whatever preconceptions they held about society's reactions to their own speech. What this appears to mean is simply that they were objective enough to concede that a listener's attitude toward stuttering might depend very much on the listener, the stutterer, and the circumstances. This is not to say that some stutterers do not project in approximately the sense in which the term is used here, or that finer techniques of investigation might not show such a tendency to be common among stutterers. It may well be that the stark projections invited in this study are to be expected only from the rare stutterer whose morbid preoccupation with unfavorable reactions received in the past borders on the obsessive. All that can be said with confidence is that the procedure used in this study failed to disclose a distinct tendency to 'project,' and

[2] A stutterer was considered to have made an interpretation unusually often if it occurred with a frequency exceeding the group average for that interpretation by more than one.

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that this tendency remains a clinical assumption in need of objective demonstration. It is possible that such projections are not quite as strong or as usual among stutterers as has sometimes been supposed.

It is true that the reactions which the stutterers ascribed to the faces on the screen were essentially unfavorable, and it might be imagined that the stutterers were projecting, if not specific impressions of their own listeners, then at least their personal malreactions to stuttering in a more general sense. But the reactions admitted by the listeners themselves, as shown in Table 1, were no less unfavorable. In turn, the stuttering which the listeners heard while being photographed was exceptionally severe. It seems likely that the stutterers' interpretations were more strongly influenced by certain actualities in the film than by any peculiarities of the viewers. A significant point in this connection is that these interpretations were not found to differ in important respects from those of a group of normal speakers. The results showed clearly enough that stutterers are likely to misinterpret facial reactions to stuttering. They failed to show that their misinterpretations are chiefly influenced by their past experience as stutterers, are abnormally morbid, or are distinguishable from those of ordinary people in any other way. A reasonable inference is that the stutterer's errors of judgment are, on the whole, rather normal misinterpretations of inherently ambiguous facial expressions. The typical stutterer appears to behave as anyone else might under the same circumstances. This is very far from saying, of course, that he is not victimized by his mistakes, or that he should not be carefully trained to recognize the unreliability of casual judgments.

Clinical Use of the Film

For two years since the completion of this experiment the film has been used repeatedly in group therapy with adult stutterers in the Brooklyn College Speech and Hearing Center. It has proved to be a valuable device for introducing the subject of listener reactions through group discussion in a systematic and convincing way. The procedure used in the clinic has been first, to allow spontaneous discussion of each listener's face in turn as it appears on the screen. Each time an interpretation is offered it is noted without comment on the blackboard. It requires hardly more than a few minutes of this to impress the group with the variety of inferences possible. Members of the group are heard to say that facial expressions 'can be interpreted in a great many ways,' 'are not enough to go on,' or 'are often misleading.' After all ten faces have been seen and discussed the entire series is shown again. This time the instructions are quite specific. The stutterers are asked to make no interpretations at all, but merely to describe as objectively as possible all of the behavior which they are able to observe in the film. This appears to make two noteworthy differences. In the first place, there is far better agreement on the descriptions than there was on the interpretations. Secondly, and more important, there is curiously little of interest to describe. For example, here is a face about which all they have found to report is a slight narrowing of the eyes. But what were those interpretations so confidently offered in response to the same face a few mo-

ments ago? Look at them again—embarrassment, pity, annoyance, surprise. Clearly, a great deal was inferred from remarkably little. Nor is this example atypical. In most cases the stutterers' conflicting interpretations prove to have been made on the strength of no more than a frown or a smile, the way in which a gaze was lowered or an eyebrow raised.[3]

The lessons revealed in this way do not take the place of further work, face to face with the listener in actual speaking situations. They are, however, calculated to shake some strongly established convictions about listener reactions, and consequently provide an effective introduction to this part of the stutterer's clinical training.

Summary

Twenty-five stutterers and 25 nonstutterers viewed a motion picture of a series of 10 persons whose faces had been filmed without their knowledge while they were listening to severe stuttering. For each face appearing on the screen the subjects were asked to select a single interpretation best describing the listener's reaction to stuttering. Examination of the subjects' responses produced these findings:

1. Subjects in both groups disagreed widely about the reactions expressed by most of the faces.

2. There appeared to be no essential difference between the interpretations of stutterers and those of nonstutterers.

3. For the most part, interpretations of the listeners' reactions failed to correspond with the reactions admitted by the listeners themselves.

4. The stutterers' interpretations did not appear to mirror their conceptions of listeners' reactions to their own speech as recorded prior to the experiment.

Clinical use of the film was discussed.

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[3]The necessity of distinguishing between inferences and descriptions in this connection, and of training stutterers to talk descriptively about listener reactions, has been emphasized by Wendell Johnson, whose 'People in Quandaries' (2) provides helpful background material for this aspect of stuttering therapy.

Speech Disorders Resulting From Bulbar Poliomyelitis

D. E. Morley

The virus of poliomyelitis belongs to a group of infectious agents which has a particular affinity for cells of the central nervous system, especially those of the anterior horn of the spinal cord and its bulbar extensions (*5*). Bower (*8*) says, 'The pathological changes produced in the central nervous system by the poliomyelitis virus consists primarily of damage to motor cells.' In cases where there is bulbar involvement, including medulla, pons, and midbrain, with resultant damage to one or more of the cranial nerve nuclei subserving the speech function, motor speech production may become defective. Speech symptoms in such cases are classified as dysarthria.

It is estimated that there are 30,000 new cases of poliomyelitis each year (*1*). Thousands of persons in this country are undergoing treatment for residual disabilities. Brown and others (*9*) have reported that the incidence of bulbar involvement among unselected cases of poliomyelitis during the 1946 epidemic in Minnesota was 23 per cent in children under 16 years of age, and even higher in patients beyond this age. Although not all post bulbar poliomyelitis patients suffer sufficient permanent neural damage to produce dysfunction at the clinical level, the speech therapist can expect to see a sizable number each year. Hence, it is useful to review the clinical signs of bulbar poliomyelitis where nuclei of cranial nerves are involved, indicating potential effects on speech production, and to consider speech examination procedures, recovery factors, and speech therapy.

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Clinical Signs

Brown (*9*) divides bulbar poliomyelitis cases in which the nuclei of cranial nerves are involved into upper and lower cranial nerve groups. The upper group includes involvement of V, VI, VII, and VIII, as well as ocular nerves. This classification is based on observations of symptomatology in special functional disturbances during life and pathologic changes found post mortem in fatal cases. Manifestations of damage consist of disturbances of mastication (motor portion of V) which may be either unilateral or bilateral, occasional ocular neural palsies (VI), paralysis of facial nerve (VII), and infrequent bilateral deafness and vestibular disturbances (VIII). The lower group includes involvement of IX, X, XI and XII with the following manifestations: difficulty in swallowing, impaired innervation of the vocal cords, nasal speech, and weakness of tongue muscles. Frank (*14*) says,

> This (bulbar poliomyelitis) is recognized by involvement of the cranial nerves

arising from the brain stem with or without dysfunction of the vital centers of circulation or respiration. The cranial nerves most frequently attacked are V, IX, X, and XI. (Other cranial nerves are rarely involved, and then usually VII.) The resultant signs and symptoms are one or more of the following: difficulty in swallowing with regurgitation through the nose; nasal voice or hoarseness; tongue, mastication, and occasionally facial paralysis (usually unilateral). Complete paralysis of both vocal cords is not common. With bulbar involvement respiratory embarrassment commonly occurs because of obstruction to the airway.

Effects Upon Speech

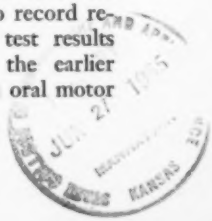
The speech disorders which result are usually of two sorts: articulation and voice. Voice defects result from damage to the cranial nuclei most responsible for innervation of the larynx, of the striated musculatures of the soft palate, and of the pharynx (principally X with additional fibers from IX and XI). Dysphonia and hyperrhinolalia are heard. The articulation disturbances result from impairment of the cranial nuclei affecting motor performances in mastication and movements of lips and tongue (principally the motor division of V, and VII, IX, and XII). The degree of musclar involvement affecting speech production ranges from mildly paralytic to severe loss of motor function, even including definite loss of reflex movement. Obviously, then, the degree of motor speech impairment can be expected to be contingent in large measure upon the degree of neuro-muscular complication.

Speech Examination

In most cases where the speech therapist is called upon to examine and to treat post bulbar poliomyelitis cases with speech impairment, the individual will have begun his program of general rehabilitation. He will have regained health sufficient to enable him to undertake physical therapy, occupational therapy, and other appropriate rehabilitation procedures. Occasionally the speech therapist may be consulted before this time to provide suggestions regarding the achieving of improved swallowing function by the patient. Several references concerning the swallowing mechanism and its function have been included in the bibliography. (*2*, *3*, *12*, *19*, *25*)

The speech therapist relies upon the neuropathologist for information concerning neurological complications. The therapist needs to be able to interpret these findings in terms of involvement of musculatures used for speech production, and he should be able to recognize reflex, involuntary clues to motor function as well as gross, voluntary performance.

The speech examination consists of two parts: observations of motor function and an analysis of speech characteristics. The observation of motor function involves an inspection of oral, facial, and laryngeal parts used in speech production as they are at rest and as they are moved. It is an efficient practice to conduct these observations methodically. After making a gross examination of appearance and mobility of the patient's face, mouth, and larynx, attention is directed to specific areas in sequence, usually following the numerical designation order of cranial nerves. The following procedures have been found useful in observing motor function. The examiner will do well to devise a check sheet on which to record results so that subsequent test results can be compared with the earlier ones. Patients will vary in oral motor



performance proficiency at the time of the examination. Some will experience continuing difficulty with drinking and swallowing; others will recover markedly in this respect but will have persistent speech difficulty. Patients vary from week to week as recovery or training becomes effective Others will maintain a relatively static status of performance.

Jaw Muscles. The examiner determines whether there is weakness or loss of power in raising, lowering, protruding, retracting, and deviating the mandible. The patient is asked to clench his jaw, open his mouth, and move his jaw from side to side. The speed, strength, and accuracy of these movements are observed. The movements are studied during chewing activities and during speaking.

Facial Muscles. The patient's ability to draw back the angles of his mouth voluntarily, to show his teeth, and purse his lips is tested. Any abnormal or asymmetrical movements are noted. Facial muscle movements during spontaneous smiling and while attempting to drink fluid through a straw are observed. The patient's kinaesthesia for movement, tension, and relaxation of these parts is checked by having him describe whether the movements he makes are rapid or slow, tense or easy.

Tongue Muscles. Observe the position of the tongue at rest and on protrusion. Strength, speed of movement, and accuracy in all directions, on command, are noted. Evidences of weakness, paralysis, or abnormal movements are checked. The patient is asked to protrude, lift the tip, and raise the back of his tongue. He is asked to perform a series of repetitive movements. As with the facial muscles, he is asked to describe kinaesthetic impressions of movement, tension, and relaxation of his tongue. Observe the swallowing skill of the patient. Is it done easily or with considerable awkwardness?

Observation of the swallowing act will be appropriate also when considering the efficiency of function of lips, velum, and pharynx. Absence, weakness, or sluggishness of movement of one or more of these parts may be detected. The patient may not be adept at moving his tongue in a way which will send the bolus or fluid toward the back of his mouth; there may be leakage of fluid into the nasal cavity, or an annoying sticking of the bolus in the pharynx. Muscular paresis may prevent the lowering of the pharynx and larynx with sufficient energy to send the bolus into the esophagus.

Velar and Pharyngeal Muscles. Observe the velum at rest and during the utterance of the vowel 'ah.' Determine whether velar movement is present and symmetrical. Test the gag reflex by using a tongue depressor to touch or to stroke the posterior pharyngeal wall or faucial pillars. If possible, observe the soft palate during yawning to determine whether movement is discernible. Ascertain whether the patient can drink fluid through a straw without nasal regurgitation.

A spirometer can be useful in making an estimate of the efficiency of the patient's velopharyngeal closure. Spirometric readings are taken after the patient has blown into the apparatus, first with the nares open, then while the nares are occluded. If the two readings are approximately the same, it is judged that with the nares open sufficient velopharyngeal closure is being accomplished to pre-

vent any appreciable amount of air leakage.

A small polished steel mirror with concentric arcs on one edge traced at centimeter intervals provides another device with which to make a roughly calibrated measure of nasal leakage of air. The patient is asked to utter an 'ah,' whistle, and so forth while the mirror is held just below the nares, with the arc traced nearest to the edge of the mirror adjacent to the midline of the upper lip. Air escaping from the nostrils will fog the mirror. Some measure of the severity of the leakage can be judged by observing how far the fogging extends across the concentric arcs. Such readings are of value for comparative purposes rather than for calibrated results.

At this point, Bloomer's (*6*) observations of palatal movement in two patients with operated facial defects should be mentioned. He studied their palatal movements during swallowing, drinking through a straw, speech, pitch and stress movements, snoring, and yawning. He noted that movements of the palatopharyngeal mechanism appear to differ according to the physiological activity being performed. From his observations he judged there was a striking contrast between the configurations of the valve during speech (including the various forms of pneumatic control) and those exhibited during the various phases of swallowing. He believes there is a distinct difference between the simple valve action and the peristaltic waves observed during swallowing. Admitting that the patterns of palatopharyngeal movement may be different during various activities, the presence of movement is critical, not the pattern of the movement. The examiner is looking for any signs of movement at this stage. It is to be expected that in some patients where movement is found it will not be transferred into speech and a distinct hyperrhinolalia will persist.

Larynx. The evaluation of laryngeal function may require the assistance of a laryngologist who is skilled in making such examinations. The appearance of the vocal cords at rest should be noted. Their movements should be observed during phonation and inspiration, and during coughing. Determine whether any involvement present is unilateral or bilateral. The cough reflex can be set off by stimulating the mucous membrane of the pharynx. This reflex consists of a deep inspiration followed by forced expiration with the glottis closed briefly by the adduction of the vocal cords.

General Information. In addition to these observations of motor function, it will be helpful to obtain information concerning the onset, duration, and recovery from the illness. The patient's present physical status and limitations should be known, and some indication of the medical prognosis should be ascertained.

Speech Characteristics. Having observed the motor function of the various musculatures, attention is turned to the second part of the speech examination, the analysis of speech characteristics. First, impressions of the general intelligibility, pitch, quality, and steadiness of the speech are obtained by engaging the patient in casual conversation. This preliminary appraisal will give clues as to the aspects of the patient's speech which need additional examination and those which are to be judged as satisfactory. In addition, during this time much can be learned concerning the patient's awareness of his

speech and his feelings about it. In some cases where dysfunction is minimal or where the patient is quite young, there will be little awareness or concern. In other cases, impatience, frustration, despondency, or chagrin will be observed. Obviously, the attitude of the patient toward his speech condition can play an important part in the speech therapy program, and the therapist will do well to note it. Further indications of his cooperation, initiative, aggressiveness, and persistence can be obtained by keeping close touch with his work and progress in physical therapy, occupational therapy, or whatever other services are being provided.

A detailed phonetic analysis is made. Sounds are tested in the context of words and phrases as well as in osolation to determine whether the character of production is consistent. The rate, agility, precision, and quality of the sounds produced are checked. In these cases there is apt to be difficulty with the velar sounds, and those formed by the occlusion of lips and tongue also are apt to be weakened, for much of the air required for their production escapes through the nose. In this respect the speech is similar to that found in cleft palate persons.

Notes are made concerning the voice of the patient with reference to the presence or absence of phonation, hypernasality, monotony, breathiness, and intensity. Air escaping through the nose during speech is checked. In some cases the hypernasality is more marked when the head is tipped forward and is less evident when the patient is lying with his head back, for the paralyzed soft palate is carried forward or backward by the pull of gravity.

Recovery Factors

On the basis of an extensive histopathologic survey of 24 fatal human cases of poliomyelitis, Bodian (7) has said that in poliomyelitis some parts of the brain seldom if ever are affected, namely: the entire cerebral cortex except for the motor area, the corpus striatum except the globus pallidus, and the cerebellar cortex except the vermis. Of these lesions he says, 'it is doubtful that they are sufficiently intense to produce clinical signs, except in rare instances.' According to Bodian, there is every reason to suppose that the patient can rapidly begin to relearn patterns of motor activity which were smoothly and subconsciously regulated by now severely damaged brain stem mechanisms. Motor re-education is of the greatest importance in assisting recovery, and in this respect the cerebral cortex must play a dominant role.

Apparently severe destructive lesions usually are necessary to produce dysfunction at a clinical level. Bodian points out that recovery of motor function 'should result from at least two processes: first, the recovery of neurons not damaged sufficiently to be destroyed, and second, the rerouting of neuron-chain discharge pathways from interrupted primary paths to secondary alternate paths. The second process is of longer duration, since it is a part of the relearning process.'

Jelliffe and White (*18*) say that 'as a rule the functional involvement by reason of edema, hyperemia, and infiltration is far in excess of the permanent anatomical loss, hence the widespread character of the paralysis in the early stages and the marked degree of recovery possible.'

Recognizing the possibility of re-

covery features in these cases, the therapist may be able to look forward to some natural help from this direction. On the other hand, where several weeks or months have elapsed since the onset of the disease, it is likely that the therapist will be faced with the problem of assisting the patient to make the best use of neuromuscular function which remains.

Speech Therapy

When the patient has become medically stabilized and adequate movements have not returned, attention is turned to seeking to restore function where needed. In cases where there is speech involvement, the therapist provides a sort of speech apparatus physical therapy program. As needed, exercises for lips, tongue, velum, pharynx, and jaw muscles are instituted to re-establish motor control and to achieve the best speed, accuracy, and duration of function of which the patient is capable. The patient then attempts to incorporate the restored or improved functions of involved parts into speech production.

A number of the principles of muscle re-education which are followed by physical and occupational therapists can be applied to working with oral musculatures. Bennett (*4*) has outlined such principles and has stated certain objectives for muscle re-education. He enumerates four objectives:

1. To obtain or regain the ability to contract voluntarily individual muscles or muscle groups.
2. To obtain or regain coordinate and effective patterns of motion.
3. To regain or increase strength in individual muscles or groups of muscles.
4. To regain or increase endurance in individual muscles or groups of muscles.

Each of these objectives is appropriate for the post bulbar poliomyelitis patient who seeks to improve function of oral musculatures. Several of the principles of muscle re-education in Bennett's outline will be useful to the speech therapist. They are:

1. The patient must thoroughly understand what is being done and what is expected of him.
2. All motion must follow as nearly as possible a normal pattern.
3. The segment controlled by the muscle group should be carried through as complete a range of motion as possible.
4. Coordination must be established before any attempt is made to increase strength and endurance of a bodily segment.
5. Exercise must be carefully graded.
6. Fatigue is not dangerous unless when fatigued, incoordination or substitution results.
7. Patient must be thoroughly instructed in his activity between periods of daily treatment.

Additional information concerning principles, concepts, and objectives in muscle re-education can be obtained from DeLorme and Watkins (*13*), Fries (*15*), Kabat (*20, 21*), and Levine (*22*).

Those who have tried to restore or to improve muscle function in speech handicapped persons know that working with the speech apparatus presents some unique problems. For example, the inaccessibility of the velum and vocal folds to all-out manipulation necessitates some indirect maneuvering. Further, where previously muscle movements have for the most part occurred on an involuntary level, it is often quite difficult for a patient to achieve skill in voluntary movement. Similarly, he is often extremely slow in achieving a kinaesthesia for muscle movement where such move-

ment previously was automatic. Hence, supplementary visualization and auditory stimulation must accompany and re-enforce whatever muscle training is provided.

Several writers in the field of speech correction have developed or adapted training materials, techniques, and devices by which to implement the principles of muscle re-education. Cable (*10*), Cass (*11*), Hansen and Longerich (*16*), Hawk (*17*), and Westlake (*23, 24*) are among those who have done this. Their material was prepared to meet the needs of patients with speech deficiencies other than those encountered in post bulbar poliomyelitis cases, but much of it is suitable for use by them. Much of it was intended for use by children, but the basic techniques are valuable and can be adapted to older persons.

Other factors affecting the speech training program must be considered. First is the fact that although a patient may show useful improvement of oral motor function and is able to transfer some of it to speech production when supervised, he does not show consistently improved speech. Second, where one or more cranial nerve nuclei important in motor speech production have been severely and irreversibly damaged, success in the rehabilitation of muscle function, and consequently in speech, is unlikely.

The problem of carry-over suggested by the first factor is a vexing one to speech therapists in work with brain-injured patients. In gait training, the patient may be able to make use of leg muscles in unassisted and resistance exercises. He is able to step correctly and to follow through. Gait seems much improved, yet as he leaves the therapy room he uses the same gait he has been trying to overcome. In speech work, a patient may be brought along from velopharyngeal movement induced by seting of the gag reflex, to recognizing the movement as he watches himself in a mirror. He is able to get the 'feeling' of the movement and to perform it voluntarily. The patient maintains velopharyngeal closure while speaking in therapy sessions. However, in most conversational speech, the hypernasality persists. There has been little tangible, consistent carry-over of improved velopharyngeal control into speech.

Clinical experience has shown that because a patient has improved in motor control of speech musculatures, it does not follow that he is guaranteed more acceptable speech. The rehabilitation of motor control is apt to be slow and difficult, and it requires persistence, perspective, and patience to achieve it. In some cases, so much time and effort are involved that there is a tendency to give up or to make less and less effort to transfer the improvement to consistent use in speech. Where the most return of function of which the patient seems capable provides only minimal useable control, it is not unusual to find him deciding that the demands of therapy do not give sufficient speech dividends to warrant the effort required to do it consistently. Even where there is good potential for restoration of movement, and with tangible control being established, the daily speech may be essentially unchanged. Here, it would seem, the personality of the patient is an essential factor. If he has not been a fairly aggressive, well-motivated, persistent individual before the onset of the disease, he will have difficulty becoming that sort of person following the debilitating effects of

poliomyelitis. If inconsistent results are obtained with a patient who makes every attempt to improve himself, the speech therapist should examine his training method to be sure that he has been explicit, methodical, and understandable in his teaching, and has provided sufficient practice at each level of the restoration process to effect sequential, automatic movement patterns by the patient.

Some bulbar poliomyelitis patients will have sustained such extensive, irreversible cranial nerve nuclei damage that return of function is unlikely. Even reflex movement may be lost. If this is the case, the outlook for speech improvement is limited even though some compensatory movements may be developed. To establish velopharyngeal closure, some prosthetic support for the velum in the form of a modified obturator may be employed; or even a surgical fixing of part of the velum against the posterior wall of the pharynx may be conceived. These measures are apt to be poor substitutes for natural occluding mechanisms and are considered as a last resort.

Summary

Persons who have had the bulbar type of poliomyelitis may have sustained damage to cranial nerve nuclei involved in speech production. Disturbances of mastication and of swallowing and paralysis of face, tongue, and laryngeal muscles may be found, resulting in varying degrees of articulation defects, hypernasality, and dysphonia. The speech therapist examines the patient's motor function of speech musculatures and analyzes the speech characteristics to ascertain the speech rehabilitation needs. In some cases, lesions are not sufficient to creat significant clinical signs. In others, the loss of motor function is confined principally to the acute phase of the disease, followed by a degree of recovery. However, where residual loss of oral motor function is found and concomitant defective speech is noted, the speech therapist can provide a training program consisting of activities to improve or to restore oral motor skills which can then be utilized in the elimination of the defective speech. Just how much improvement can be achieved is dependent upon (1) the extent of damage to neural mechanisms, (2) whether there is any natural recovery of function, (3) how much the patient can use returned function for speech improvement, (4) the initiative and persistence of the patient, and (5) the effectiveness of the therapist's program for the patient.

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Native American Listeners' Adaptation In Understanding Speakers With Foreign Dialect

Joseph B. Chaiklin

It has been observed that while listening to a person speak English with a foreign dialect there is often difficulty in understanding what he says. The degree of difficulty apparently depends upon how much the speaker's dialect distorts the phonetic nature, intonation, and stress patterns of the English language.

It has been observed, furthermore, that a foreign speaker using the English language appears to become more intelligible with the passage of time; that is, the longer he is heard, the better he is understood. It might be postulated that the listeners have adapted to the speaker's dialect, and because of this adaptation, the speaker may be perceived as being more intelligible. This phenomenon, while it has been observed by those teaching the foreign speaker, has not been studied extensively for experimental verification and quantification (2).

It was the purpose of this study to investigate the nature of native American listeners' adaptation in understanding speakers with foreign dialect. The direction and magnitude of such adaptations were the focal areas under consideration.

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Procedure

Subjects. Two 10 member panels listened to two foreign speakers. The listeners were college students at the Ohio State University. Their mean age was approximately 20 years. There were two basic criteria used in selecting listeners: (1) native birth with English as the native language, and (2) normal hearing. The latter was determined by an audiometric sweep check at a 15 db level.

Both speakers were male students at the Ohio State University. Both were born in Czechoslovakia and spoke Slovakian as their first language. At the time of the experiment they had been in America for 17 months. Neither of the speakers had any knowledge of spoken English upon arrival in this country. Their dialect constituted a noticeable hindrance to effective communication.

The Recording Process. Each speaker made two 40 minute recordings, the recording sessions being spaced 48 hours apart. The recordings were made on magnetic tape with a Magnecorder tape recorder (Model PT 6 JAH) linked to a Western Electric 633 microphone. The speakers monitored their voices by keeping the indicator needle of the recorder at a

designated level. They were assisted in maintaining this level by the use of a carrier phrase before each of the test items.

The Stimulus Materials. The stimulus materials consisted of equated intelligibility lists (four different lists for each recording), and equated prose passages (three for each recording). The lists were drawn from the Harvard PB (Phonetically Balanced) series of intelligiblity lists (*1*). The prose material consisted of short biographical sketches. Each passage was 250 words in length. These short biographies of famous people were used to familiarize the panels with the connected speech of the speakers—a type of inter-test stimulation. The materials were arranged so that first an intelligibility list was read, then a prose passage, followed by an intelligibility list, etc. This arrangement of the intelligibility lists permitted periodic measures to be made of the possible listening adaptation of the panels.

The Control of Speaker Adaptation. Since the present study was concerned with adaptation effects produced in *listeners*, it was essential that *speaker* adaptation be put under experimental control. This was done by recording the words of each PB list in an ordered dispersion during the 40 minute recording sessions and then splicing the lists back into proper order for listener presentation. There were four PB tests in each recording session. Before the recording process, each list was divided into four segments. During each recording there were four major time units; that is, the time span required to record a 50 item list with carrier sentence was one major time unit. The four segments of each 50 item list were arranged so that one segment from each list would be recorded in a different part of each of the four major time units. After recording, the original lists were reconstructed by splicing the four segments into their original order. Each final list, as presented to the listeners, was composed of parts recorded during the entire recording process; hence, the effect of the speaker adapting, or improving through time, on any given list was presumed to have been put under adequate experimental control.

The Listening Process. Free field listening was employed for all listening sessions. The stimuli were played back on an Ekotape recording machine (Webcor Electric, Model 114) which was linked to a ten inch, eight ohm Altec speaker. The output of the speaker as measured by a General Radio Sound Level Meter (Type 759-B,C scale) six feet removed was 80 decibels. Each listener was seated approximately six feet from the speaker, and occupied the same seat for both listening periods.

Listeners responded to the intelligibility lists by writing down their heard responses on prepared answer forms. After responding to a 50 item list they listened to three minutes of connected discourse without being required to make written responses. The listeners' answer sheets were corrected and mean intelligibility scores computed, with a score of 100 per cent being the highest score obtainable. The data were arranged in a form which permitted easy handling for statistical analysis.

Results

To help clarify the ensuing discussion of the statistical analysis, the mean percentage scores of both panels are presented in Table 1. An examination of the scores may help to give an

TABLE 1. Mean per cent intelligibility scores (possible score of 100%) of the two panels for both days of listening.

	List 1	*List 2*	*List 3*	*List 4*
Panel I, Day I	45.0	51.2	60.4	48.8
Panel I, Day II	52.8	45.0	41.6	46.8
Panel II, Day I	41.0	39.0	42.6	42.8
Panel II, Day II	39.4	38.6	44.4	40.4

indication of the trends evidenced during the listening process.

The score of each listener for a list was used as the basic measure in an analysis of variance which had two sources of variation in its design: (1) *Conditions* and (2) *Listeners*. There were three such analyses performed for the responses of each panel: one for each day, and one in which the scores for the first and second days were pooled and considered as one unit. Where the *F* ratio was significant, *t* tests were run to determine whether significant differences existed between the scores for time units within the recording sessions.

Each of the two listening panels was assigned a number at the start of the study. One panel was designated 'Panel I,' and the other 'Panel II.' In a similar manner, the speaker assigned to Panel I was called 'Speaker I' and the speaker assigned to Panel II was called 'Speaker II.' The following discussion of the results will make use of these designations.

The analysis of variance for the scores of Panel I (Table 2) indicates that the *F* ratio for *Conditions* for the first day of listening is 15.49, which is significant at the 1 per cent level of confidence; the *F* ratio of 8.88 for *Conditions* on the second day is significant at the same level. This indicates a significant difference among listening periods for Panel I's two days of listening. The analysis of variance for Panel II's first day of

TABLE 2. Analysis of variance for word identification scores of Panel I for both listening periods.

Sources of Variation	*df*	*SS*	*MS*	*F*
	First Day			
Listeners	9	787.00	87.44	3.14*
Conditions	3	1293.00	431.00	15.49*
Remainder	27	751.00	27.81	
Total	39	2831.00		
	Second Day			
Listeners	9	1707.00	189.67	10.31*
Conditions	3	660.40	220.13	8.88*
Remainder	27	576.60	21.36	
Total	39	2944.00		

*Significant at less than the 1 per cent level of confidence.

TABLE 3. Analysis of variance for word identification cores of Panel II for both listening periods.

Sources of Variation	*df*	*SS*	*MS*	*F*
		First Day		
Listeners	9	696.10	77.34	2.52†
Conditions	3	93.10	31.03	1.01
Remainder	27	829.90	30.74	
Total	39	1619.10		
		Second Day		
Listeners	9	762.40	84.71	3.84*
Conditions	3	198.80	66.26	3.01†
Remainder	27	595.20		
Total	39	1656.40		

*Significant at less than the 1 per cent level of confidence.
†Significant at the 5 per cent level of confidence.

listening (Table 3) produced an *F* ratio of 1.01 for *Conditions*, which was not significant at the 5 per cent level of confidence. The *F* ratio for Panel II's second day for *Conditions* was 3.01, which is signifcant at the 5 per cent level of confidence. Thus, for Panel II it could be said that no significant differences existed among the four time periods in its first day of listening to Speaker II, but that there appeared to be significant differences on the second day of listening. Tables 2 and 3 indicate highly significant differences attributable to *Listeners;* that is, for both panels during *all* listening periods the listeners showed a high degree of variability among themselves in their mode of response.

Individual *t* tests were run between the means for Panel I's first day, as well as for its second day, and for Panel II's second day. Table 4 summarizes these tests. The *t* tests for Panel I's first day indicated a significant (1 per cent and 5 per cent levels of confidence) change between the means of the four listening conditions with a sharp dropping off in level of response noted at the end of the period. This might be described as a low-to-high-to-low pattern. On its second day, Panel I, as evidenced by *t* tests significant at the 1 and 5 per cent levels, showed significant changes between listening conditions with a significant diminution of response for the middle part of the listening period, and a significant rise at the end of the period. This differs from the response of Panel I's first day where a significant drop was noted at the end of the period.

The *t* tests for Panel II's second day indicated a significant rise in level of response from the second to the third conditions with a significant dropping off for the fourth and last condition. This pattern of response was noted in the first listening experience of Panel I, i.e., the reaching of a definite level of response with a dropping off in level of response at the end of the period.

Summary of Results. The results indicate that there was some adaptation exhibited for Speaker I by Panel

I on the first day of listening: more than a 15 per cent rise after 30 minutes of listening. There was a drop in level of response when the first and second days of Panel I were compared as separate units, although the panel responded at a higher level for the first list of the second day than they did for the first list of the first day. When the conditions for both days were considered as one continuous event, significant differences were revealed between means. The significant rise in response at the end of Panel I's second listening experience suggests that a high-to-low-to-high pattern of response may be a possible listening pattern for such experiences.

There appeared to be no appreciable adaptation effect during Panel II's first day of listening, but there was a significant rise for one list on the second day. Panel II's total responses for each day were not significantly different from each other, which would indicate that there was a fairly consistent response from day to day in its listening performance.

Conclusions

The results obtained during the course of the study permit the following tentative conclusions:

1. Listeners have a tendency to show changes in their level of response when listening to speakers who possess a foreign dialect.

2. The changes observed appear to have little consistency, which leads to the conclusion that for the time periods tested in this experiment there

TABLE 4. Summary of *t* tests between means for Panels I and II: within days (df = 9).

Measure	*List*	*Mean*	*List*	*Mean*	*Diff.*	*t*
First day—Panel I, Speaker I:	1	45.0	2	51.2	-6.2	2.12
	1	45.0	3	60.4	-15.4	7.16*
	1	45.0	4	48.8	-3.8	1.21
	2	51.2	3	60.4	-9.2	4.32*
	2	51.2	4	48.8	2.4	.98
	3	60.4	4	48.8	11.6	6.01*
Second day—Panel I, Speaker I:	1	52.8	2	45.0	7.8	6.09*
	1	52.8	3	41.6	11.2	4.67*
	1	52.8	4	46.8	6.0	2.66†
	2	45.0	3	41.6	3.4	1.78
	2	45.0	4	46.8	-1.8	1.20
	3	41.6	4	46.8	-5.2	2.57†
Second day—Panel II, Speaker II:	1	39.4	2	38.6	-1.2	.53
	1	39.4	3	44.4	-5.0	1.81
	1	39.4	4	40.2	-.8	.37
	2	38.6	3	44.4	-5.8	3.39*
	2	38.6	4	40.4	-1.8	1.17
	3	44.4	4	40.4	4.0	2.82†

*Significant at less than the 1 per cent level of confidence.
†Significant at the 5 per cent level of confidence.

are probably no stable adaptation effects produced in the understanding of speakers with a foreign dialect.

3. There appears to be a high point of response during a given listening experience, the high point showing wide variability among listeners.

4. Some listeners show marked adaptation effects in understanding speakers with foreign dialect, some show mild adaptation effects, while some appear to show no adaptation effects at all (within the time limits of this study).

5. During its initial stages listener adaptation to foreign dialect appears to be a highly variable and individual process.

6. Stable normative trends in the adaptation process may appear only after a longer series of exposures than was used in this study.

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Lateralization Of Cerebral Functions

Robert W. Bauer

Joseph M. Wepman

Relationships between handedness, focal lesions in the cortex, and language disturbances after cerebral trauma have long been a source of interest and equally a source of much confusion in clinical literature. Recently, the question of localization of certain intellectual functions in the cerebral hemispheres has been raised. Aspects of these problems related to sidedness or to particular hemispheres involved in lesions, in overt behavior, in language behavior, and in intellectual functions seem complex enough to warrant this separate presentation.

Cerebral Dominance and Laterality. It appears to be common practice in the literature to infer that the left hemisphere is dominant if an individual is observed to use his right hand for most activity, and vice versa if he tends to use the left. However, studies of handedness and other aspects of motor behavior present no such clear-cut pattern of cerebral dominance.

Hildreth (*8*) reported observations of handedness in the play of two-year-old nursery school children. Handedness was checked in many untrained motor acts. One of her conclusions was that though some children were observed to be consistently right-handed, there were no children observed to be equally left-handed. Hildreth used an index of dominance developed by Koch (*11*) and used also by Durost (*6*):

$$\frac{R-L}{R+L} = \text{Index of Dominance.}$$

Hildreth (*8*) reported that negative scores indicating consistent left-handedness almost never appeared in observations made on a mixed group of over 40 two, three, and four-year-olds.

Using the same index, Koch (*11*) studied multiple aspects of handedness in over 200 college students and obtained comparable results. Her investigations, like others, suggest the possibility that consistent left-handedness is extremely rare, and that many persons described as being left-handed probably do not differ significantly from those labelled as ambidextrous. Durost (*6*), studying over 1,300 New York City public school children, also noted that individuals who feel themselves to be at least moderately left-handed tend to fall into the ambidextrous range or even into the right-handed distribution when measured by objective tests.

These studies suggest the hypothesis that while right-handedness tends to be comparatively consistent (and probably means left-hemisphere dominance) left-handedness and ambidexterity are so similar and so incon-

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sistent that no dominance can be determined from the behavior noted. This would imply that no right-hemisphere dominance exists, but rather some failure or difference of cerebral lateralization develops with maturity. This might also suggest the possibility that real cerebral dominance is always localized in the left hemisphere and that so-called left-handed and ambidextrous people represent deviations due to inadequate development of dominance or due to acquired left-handedness or ambidexterity, but not to innate right cerebral dominance.

Language and Hemisphere Representation. Clinical studies of aphasic disturbances in adults present a similar confusion between accepted theory and research. Despite an accumulation of evidence to the contrary (*10, 13, 14*), many authorities in neurology and neurophysiology (*4, 5, 7, 12, 15, 16*) still maintain that aphasia only results from lesions to the side of the brain contralateral to the dominant hand. Some writers make allowances for exceptions to the rule. Wechsler (*15*), for example, suggests that in exceptional cases such as unrecognized left-handedness or in instances of 'uncrossed pyramidal tracts,' a right-sided lesion may produce aphasia in an apparently right-handed person. Both Wechsler (*15*) and Nielsen (*12*) make the assumption that the right (minor) hemisphere may take up the function of language after the left (major) hemisphere is damaged. This would account for recovery from language disturbances after left-hemisphere damage. This migration of function to the undamaged minor hemisphere would be one way of explaining the restoration of language reported after total left hemispherectomy (*9, 18*).

Another viewpoint held by some is that no automatic assumption of function by the minor hemisphere occurs. Note the consistent failure of many patients with limited left hemisphere damage to develop useful language. If such a shift does occur it apparently is selective, rarely automatic, and often non-operative. One of the present writers (Wepman) holds that recovery of language is more likely to result from the development of function in additional areas of the damaged left hemisphere when specialized nerve tissue is available. He further postulates that language symbolization may not be the function of the cortex but rather of the integration of the cortical and sub-cortical nervous system. Recovery of symbolization then would depend upon the ability of the individual cortex to reassume the integrative, hierarchic control over the sub-cortex rather than upon a total migration. Only when the destruction of the left hemisphere is complete is there a likelihood of total transfer. Thus, a left hemisphere capable of partial function after trauma would need to develop new integrative controls, new cortical-sub-cortical pathways, while a left hemisphere completely unable to function might present the possibility of shift to the right hemisphere. If this reasoning be true, therapeutic failures would depend upon: (1) Partial destruction of such a nature that the symbolic integrations necessary for language are impossible. In this case vital functions remain and, therefore, there is no migration; (2) Inability of therapists to stimulate, facilitate, or motivate the patient properly or successfully.

The rule in question here is the well accepted one that right-handed persons are left-brained for both language and handedness while left-handed peo-

ple are right-brained for both (cerebral dominance theory). Clinically, this rule seems to apply for patients who are right-handed. However, the previously noted literature on handedness casts some doubt on the reliability and the validity of the conventional concept of left-handedness. Even in the occasional completely left-handed person one rarely finds right hemisphere damage producing aphasia. Evaluation of the few cases reported shows the language disturbances were very temporary or limited to motor apraxias. Further confirmation of the difference between the function of the right and left hemisphere is reported by Penfield and Rasmussen (*13*). They found that electrical stimulation of the left hemisphere elicited two types of response. One they called 'aphasic arrests,' the other 'speech arrests.' Stimulation of the right hemisphere produced only 'speech arrests.'

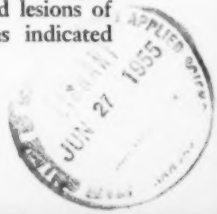
In a study by one of the authors (2), 30 patients with single, unilateral, cerebro-vascular accidents were examined for language and intellectual disturbances. Seventeen had suffered left hemispheric damage; eight of these showed aphasia. Thirteen cases had a lesion in the right hemisphere. One showed an auditory verbal agnosia, and another an apraxia for speech and numbers. The patient with the auditory verbal agnosia was a right-handed man with a mild cerebro-vascular disturbance affecting primarily the right frontal and right parietal areas. The other patient was a left-handed man with a cerebral thrombosis affecting the left frontal and temporal lobes.

These two cases of lesions of the minor side provide evidence against the long-standing, well-accepted principle relating cerebral dominance in handedness and language. In both cases there was the suggestion of mixed laterality. It is impossible to prove that an aphasic, hemiparetic patient was consistently right or left-sided before the trauma which has left him no alternative as to his motor side. In both cases the aphasia was mild and the symptomatic evidence was therefore sparse. In one case, perhaps more than in the other, psychological testing followed so soon after the cerebro-vascular accident that the phenomenon demonstrated might have been a transient aphasia such as may follow temporarily upon any cerebral trauma no matter what the locus.

However these two cases may be regarded, it should be noted that among the twelve right-handed patients with contra-lateral lesions of the left (or major) side, seven were aphasic. This corresponds to the proportion of aphasic patients expected clinically from cases of lesion to the left hemisphere, roughly, 50 per cent. But among the four left-handed patients with contra-lateral lesions of the right (or major) hemisphere, there was not one aphasic. The only left-handed patient with aphasia found in this study was the case reported above, whose lesion was on the left side of the head.

These findings were not regarded as conclusive, but they suggested that some criterion other than handedness might better indicate cerebral dominance, and an effort was made to check them against other data available in the literature.

Probably the most authoritative and comprehensive study of aphasia is that of Weisenburg and McBride (*16*). Included in their study were sixty aphasics of tumor and vascular origin. Two of these aphasics had lesions of the 'minor' hemisphere as indicated



consistently by handedness tests. One of these was a right-handed patient with a right hemisphere lesion indicated by neurological signs. The other was a left-handed patient with a demonstrated lesion of the left hemisphere. These results are perhaps more convincing evidence against the conventional concept of dominance than the cases cited previously because they were both more clear-cut in their handedness and they were tested repeatedly over a much longer period of time, thus allowing for the disappearance of any transient aphasia. Weisenburg and McBride (*16*) also included data on four cases of aphasia with 'mixed' handedness; three of these lesions were localized in the left hemisphere and one in the right. They also reported one demonstrated right hemisphere lesion which caused aphasia in a left-handed person as per expectation.

Weisenburg and McBride (*16*) drew no inference from these results to question the established view. However, it seems apparent that though the differences in lesion localization between right-handed aphasics and aphasics of mixed or left-handedness are striking, these differences do not correspond to the conventional view that aphasia appears with lesion of the dominant hemisphere as indicated by handedness. In Tables 1 and 2 it can be seen that the hand-dominance rule held for sixty out of sixty-two right-handed aphasics, but it failed in two out of three left-handed aphasics. It would seem more correct that aphasia nearly always occurs with left hemisphere damage regardless of handedness.

TABLE 1. Ten aphasics reported by Bauer (*2*).

Handedness	*Hemisphere of Lesion*	
	Left	*Right*
Right	7	1
Mixed	1	0
Left	1	0
Totals	9	1

TABLE 2. Sixty aphasics reported by Weisenburg and McBride (*17*).

Handedness	*Hemisphere of Lesion*	
	Left	*Right*
Right	53	1
Mixed	3	1
Left	1	1
Totals	57	3

Recently, Roberts (*14*) reported data collected by Penfield and his associates on stimulation and excision of language areas in epileptic patients. On stimulation of the left parietal and temporal regions, sixty-four out of eighty right-handed patients showed speech alterations resembling those of aphasic patients. Of twelve left-handed patients, four showed such speech alterations. The authors pointed out that seven of the eight left-handed patients who did not manifest speech alterations had left cerebral injuries prior to the age of two. However, there was no discussion of the sixteen right-handed patients who showed no alteration. The failure of the phenomenon in these twenty four cases in which no alteration appeared may also have been due to some increased resistance to electrical interference in these cases.

Roberts (*14*) also reported on aphasia after operations:

> Aphasia occurred after operations on the left hemisphere as follows: (1) right-handed patients, 124 of 178; (2) left-

TABLE 3. One hundred sixty-four aphasics reported by Roberts (*14*).

Handedness	*Hemisphere Operated* *Left*	*Right*
Right	124	2
Unknown	16	0
Left	19	3
Totals	159	5

handed, 19 of 67; and (3) handedness unknown, 16 of 29. If the patients with injury at birth or within the first two years of life are excluded, 13 of 18 left-handed patients had aphasia after operation on the left hemisphere. Aphasia followed operation on the right hemisphere twice in 258 right-handed patients, three times in 23 left-handed patients, and did not occur in 18 patients whose handedness is unknown.

A summary of these data appears in Table 3. Roberts concluded:

> Excision of the usually delineated areas of speech in the left hemisphere of patients having their initial injury at birth or within the first two years of life usually has not resulted in aphasic defects. Electrical interference with speech and excision followed by transient aphasia have shown the left hemisphere to be dominant in practically all other patients.

This would agree with the previous discussion. It would seem that with right-brain involvement, aphasia is relatively rare even among left handed patients. Left hemisphere damage prior to development of speech patterns in infancy has been suggested as a possible explanation of some right-brain damaged aphasics.

An extremely interesting and relevant study was that of Humphrey and Zangwill (*10*) who studied 1150 cases of penetrating brain wounds from World War II records to find only 10 cases fulfilling the following criteria: (1) Lesion unilateral in language areas; (2) test results indicating aphasia; (3) positive information that the patient was left-handed; and (4) average pre-traumatic intelligence. It happened that the ten left-handed patients with unilateral lesions were divided equally between right and left hemisphere lesions. Some evidence of aphasia was found in all five cases of left hemisphere lesion, and in four of the five right hemisphere cases. On balance, the aphasic symptoms were more numerous and severe in the left hemisphere group, although defects of calculation were more prominent in the right.

Humphrey and Zangwill (*10*) concluded that:

> . . . if left handedness were correlated with 'right-brainedness' to the same extent as right-handedness with 'left-brainedness,' as has commonly been assumed, then dysphasia would have been expected to occur only in the right hemisphere injuries. Our findings go even further against the traditional view in that the various forms of language disorder with the exception of dyscalculia show a higher incidence in the cases of left hemisphere injury.

They found that only one of the carefully selected cases reported was free from aphasic symptoms. From this fact, they reasoned that cerebral dominance for language function either does not occur in the so-called left-handed person or it tends to be less well-developed than in the right-handed person.

Humphrey and Zangwill reported also on 492 cases studied from the point of view of handedness, site of lesion, and presence or absence of aphasic symptoms. Of these, 114 were aphasic (including the nine discussed above). They concluded (*10*):

> Thus it would be impossible to select from this group of right-handed aphasics ten cases showing a comparable division between left and right-sided lesions, while it is extremely unlikely that, if ten cases were selected at random from the

TABLE 4. One hundred fourteen aphasics reported by Humphrey and Zangwill (*10*).

Handedness	*Hemisphere of Lesion*	
	Left	*Right*
Right	104	1
Left	5	4
Totals	109	5

total right-handed group of 436 cases, only one would be free from dysphasia.

Thus they implied that cerebral representation of language functions in left-handed cases must be bilateral to a greater degree than in most right-handed persons. This interpretation is consistent with the Weisenburg-McBride results, though not with their conclusions. These findings are also consistent with those of the best reported studies of laterality in peripheral motor functions.

Hemisphere of Lesion and Intellectual Impairment. In a study by Bauer and Becka (*3*) right-sided cerebrovascular accidents were found associated with marked deficiencies in several intellectual functions, particularly in visual and auditory patterning, visual-motor reproduction, and pictorial-situational comprehension and judgment. Such a difference between left and right-sided lesions in their effect on intellectual impairment has been previously noted by other writers. Andersen (*1*) found individuals with lesions of the 'minor' hemisphere showing greater impairment in the performance sub-tests of the Wechsler-Bellevue Scale. Weisenburg and McBride (*16*) who studied a control group of twenty-two patients with right-sided lesions in connection with their larger study of aphasia, found right-sided cases to be inferior to the normal control group in all performances tested. They found particularly significant defects in reading comprehension, arithmetic computation, sentence completion, and the Porteus mazes. In contrast with the deficiencies in language found in aphasic patients, cases with right-sided lesion without aphasia were more like the normals with respect to language, but less like the normals on non-lauguage and arithmetic tests. Humphrey and Zangwill (*10*) also found the incidence of aphasic symptoms higher and more severe in the left hemisphere group, while right hemisphere cases showed more impairment of calculation. This was true even among the ten left-handed patients with unilateral lesions, five right and five left.

These findings lead to the conclusion that lateralization of language functions and peripheral motor manipulations in the left hemisphere may be paralleled by a specialization of right-hemisphere tissue in certain intellectual functions. These functions particularly include comprehension of ideas and social situations, patterning or simple abstraction in melody and form, visual-motor planning and form reproduction, and arithmetic computation.

Summary. The reported results have some implications for a general hypothesis concerning brain function. Cerebral dominance seems unique to the left hemisphere. Those in the population who lack consistent left hemispheric dominance do not appear to have consistent right hemispheric dominance except in rare instances. This would imply that individuals commonly regarded as left-handed are more likely to be ambidextrous, and probably should be said to be people in whom lateralization has not fully developed.

Language functions show a similar

cortical development. The left hemisphere is found to be involved in the symbolic language act in practically all subjects studied. Two particular groups are apparent exceptions; (1) those brain-injured prior to the second year of life, and (2) those few subjects who have endured total left hemispherectomy.

Intellectual functions not involving language appear to be particularly impaired with right-hemisphere lesion. This suggests the hypothesis that lateralization of certain functions in the left hemisphere may be paralleled by a specialization of right-hemisphere tissue in certain performances which involve social and ideational comprehension, visual-motor planning, patterning and reproduction, auditory patterning, and arithmetic computation. Whether such lateralization of intellectual functions is associated with maturation, as is suggested by the evidence regarding handedness and language functions, remains to be seen.

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Auditory Dedifferentiation In The Dysphasic

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Bernard T. Hartman

This is a report of a research project concerned with an investigation of the auditory perception of persons with lesions of the central nervous system resulting in dysphasia. The study was accomplished by means of a test designed to measure auditory dedifferentiation in normal and dysphasic persons.

The primary motivation of the study was the desire to learn more concerning the listening function in the dysphasic, for it was felt that an increased understanding of this process might eventually lead to improvements in present testing and rehabilitory methods. Further, a search of the pertinent literature revealed that, although much has been written concerning visual and tactual involvements found occurring with central neuropathologies, little mention could be found regarding auditory disorders. Finally, hearing constitutes one of the most basic and important of the sensory modalities through which relationships with the environment are established (*1*), and a distrubance of the listening function (although no significant lessening of auditory acuity be present) might well influence the fundamental adjustment patterns of the dysphasic person and lead to special problems with reference to his speech and language rehabilitation.

The term 'dedifferentiation' was proposed by Goldstein (*2*) to designate a breakdown in the ability to distinguish between the 'foreground' and the 'background' of a given sensory, motor, or ideational configuration. In this study hearing alone was investigated.

Purpose

The study proposed to ascertain whether or not the adult dysphasic showed dedifferentiation of the auditory function to an extent greater than that found in the normal adult. The considerations leading to the formulation of this problem are as follows:

Since the early part of the 19th century the specific linguistic and neuromuscular symptoms following injury to the brain have been exhaustively studied. More recently interest has centered upon the more subtle, generalized changes in behavior which are also secondary to brain injury (*6*). Among the several modern investigators to attempt a comprehensive approach to the study of dysphasia is Goldstein. His research con-

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cerning the etiology and symptomatology of dysphasia has proved to be most heuristic, for Goldstein (*2*) identified not only specific linguistic distrubances but also the more generalized alterations in personality and behavior such as perceptual dedifferentiation and disturbances of the abstract attitude. Recourse to the history of the study of aphasia will show that Goldstein has followed in the tradition previously established by Jackson and Head (*4*). As a result of studying a large number of brain-injured adults, Goldstein (*7*) concluded that all of the alterations in behavior which tend to persist even after the lesion in the brain has healed, may be related to disturbances in the organizing and integrating mechanisms used by the organism in its attempts to maintain equilibrium among the many competing forces impinging from within and without. In the realm of sensory function, the lessened integrating and balancing functions of the brain are seen to result in an inability to distinguish accurately among the various aspects of a perceptual configuration. Seen from the point of view of the Gestalt psychologist, these changes in patterns of perception concern faulty differentiation between the 'foreground' and 'background' of a given percept (*3*). This disability can be termed *perceptual dedifferentiation.*

The problem of perceptual dedifferentiation has been related to the testing and habilitation of the brain-injured child by Strauss and Lehtinen (*5*) who describe research which supports the contention that perceptual disorders of the figure-ground type are significant to the understanding of the brain-injured child. In addition, these investigators describe a number of varied tests which were designed to elicit visual, tactual, and auditory differentiating abilities in normal and brain-injured children. The results of these tests validate, to varying degrees, Goldstein's theory of figure-ground disturbances in brain injury. Consistently noted was the inability on the part of the brain-injured child to discern and grasp the essential nature of a perceptual whole, particularly if a background were provided which rendered less salient the figure or foreground. For example, the marble board test used to investigate visuo-motor skills, and pictures displaying figures imbedded in a clearly structured, homogeneous background, showed that the brain-injured child had greater than normal difficulty in perceiving and reproducing the figures than the non-brain-injured child of similar age, intelligence, etc. (*5*).

Study of tactuo-motor skills calling for the reproduction of patterns explored manually again pointed to the fact that the brain-injured child had considerable difficulty in producing the patterns whenever the figures were placed against a diffusing background (*5*).

Werner and Bowers (*8*) investigated auditory perception in children by means of tests calling for the reproduction of simple patterns of melody. Here the brain-injured child exhibited a deficient, erratic type of test behavior when compared to the normal child, thus indicating a lessened ability to grasp the essential melodic whole. This and other evidence suggested the need for an investigation of auditorily elicited figure-ground functions as they obtain in the perception of speech by brain-injured individuals. It was felt that this inquiry might well yield data of

interest to the speech and language therapist, in that the demonstration of auditory differentiation might have implications with regard to the diagnosis and prognosis of central neurological lesions, and the linguistic disorders which accompany them.

Population and Procedures

According to Goldstein (7), the presence of a brain lesion tends to produce certain basic changes in the ability to differentiate the various aspects of a sensory configuration. This study proposed to elict auditorily this ability in brain-injured and non-brain-injured persons so as to measure and compare respective abilities in this regard. In order to secure experimental control, each brain-injured person studied was carefully matched with a non-brain-injured person according to certain major factors: age, sex, average hearing sensitivity, social-economic level, and educational attainment. The experimental design was devised to investigate adults, hence no children were studied. Subjects ranged in age from 17 to 64 years, in educational level from the fourth grade to college graduation, from the lowest to the highest socio-economic levels, and from unskilled to professional level occupations. The brain-injured persons were selected according to the following criteria: (1) a medically diagnosed brain lesion, (2) history of the lesion for at least two years, (3) the ability to respond orally to speech, (4) the ability to walk and (5) the ability and desire to cooperate in the investigation. Ten brain-injured and ten non-brain-injured subjects were studied.

Auditory Differentiation Test

As speech was to be the foreground stimulus used in the auditory differentiation test, a recorded test containing test words in the foreground and noise in the background was devised. Disc recordings were used and two equivalent word lists were developed. The first section of the test containing the word lists without the background noise was used to test the subjects' ability to respond to auditory stimuli in isolation, and was so arranged that word pairs were progressively attenuated without an induced noise background. The second section of the test was arranged to investigate the subjects' ability to respond to a similar list of words, again progressively attenuated and presented against a background of masking noise continuously recorded at a constant level of attenuation. The background stimulus was obtained from a standard Maico audiometer, Model D-5; this masking noise is described by the Maico Company as a modified power hum. Both sections of the test were recorded in acoustically isolated rooms so that the ambient noise levels were reduced to a minimum. The test words and the background noise for the second section of the test were transmitted to a recording studio where they were recorded simultaneously. High fidelity amplifying, attenuating, and recording equipment was used in the preparation of the test discs. The input levels involved in recording the test words and background noise were monitored so as to insure the highest possible degree of uniformity in the intensity levels of the recordings. The tests were first recorded upon plastic base tapes, and from these, the test discs were trans-

cribed. Care was taken to obtain the highest possible fidelity of reproduction.

The first test side was 250 seconds in length and consisted of 34 familiar and concrete nouns, such as 'nose-car', 'apple-foot', 'mouth-table', etc., with two words recorded at each intensity level. There was no experimentally induced background noise. The first pair of words was recorded with an input to the recorder at a level of approximately 50 decibels above normal auditory threshhold for speech. Each succeeding pair of words was recorded 3 decibels below the preceding one. Thus, there was a difference of 48 decibels between the first pair of words and the last, with the last pair of words recorded at approximately two decibels above normal speech threshold. The words were recorded 7 seconds apart.

The second set of words was recorded with experimentally induced background noise and was 230 seconds in length. In this case there were 30 test words, two words to an intensity level. Again, the first pair of words was recorded with an output to the recorder at 50 decibels above normal speech threshold, and each succeeding pair of words was recorded three decibels between the first and the last word pairs. Background noise was recorded at a constant level of approximately 30 decibels above normal threshold. Thus, the first pair of test words was approximately 20 decibels above the background noise level and the last pair 20 decibels below it. It was necessary to establish this signal to noise ratio because of the relative ineffectiveness of the modified power hum as a masking agent. Again, the words were recorded 7 seconds apart.[1]

High fidelity playback equipment was used in the administration of the test and the standard VU meter and attenuating systems of clinical speech testing equipment were used to set the output levels of the playback equipment so that each subject was given the test words and background noise at the same intensity levels. In addition, standardized procedures were used in introducing the subjects to the examination situation and administering the tests; the same investigator did all the testing. Binaural receivers presented the tests to the subjects.

All of the single word responses given by the subjects were obtained verbally, and each word was scored either right or wrong with no partial credits earned. The tester was seated in the testing room with the subject, and the responses were taken down phonetically on a previously prepared test form. Also, the subject was carefully watched for signs of the catastrophic reaction. The test scores consisted of the total number of correct responses obtained.

Results

When *t* scores were derived from the mean test performances achieved by the two groups on the tests with and without the background noise, it was possible to arrive at the follow-

[1]The signal to noise ratios used in recording the test were arrived at by checking the ability to perceive speech in noise of five normally hearing university students and faculty members. The speech testing equipment used in making the recordings and presenting the tests was calibrated regularly in the usual manner.

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ing indices of test performances: (1) the mean difference existing between the performances on the first test (without noise) obtained from the control and experimental groups was expressed by a *t* score of 0.712. This figure does not represent a significant difference; therefore both groups performed equally well on the tests without noise; (2) the mean difference existing between the results of the first test, without noise, and the second test with noise, obtained by the control group, was expressed by a *t* score of 0.142, a figure not indicative of a significant degree of variation, indicating that the non-brain injured group performed equally well on both tests with and without background noise; (3) the mean difference existing between the second test with background noise obtained by the brain-injured group and by the non-brain-injured group was expressed by a *t* score of 6.32 at the 0.001 level of confidence, which is a significant degree of variance for this experimental configuration, and indicates that the brain-injured group performed significantly more poorly than the normal group, when the experimentally induced noise was present; and (4) the mean difference existing between the results of the first test without background noise and the second test with background noise obtained by the brain-injured group was expressed by a *t* score of 5.42 at the 0.001 level of confidence. For this experimental array, this constituted a significant degree of variation.

Conclusions

The results of this study make it possible to conclude that there is a breakdown in the auditory differentiating ability in the brain-injured person; and that in company with other exteroceptive functions, figure-ground differentiating ability in auditory perception is also disturbed by the presence of a central nervous system lesion with no significant lessening of auditory acuity necessarily being present. It would seem then that the existence of auditory dedifferentiation lends support to the holistic concept of brain function, for this lack of differentiating ability in auditory perception seems to relate to a generalized lessening or breakdown in the organizing and integrating functions of the brain. It is hoped that further study in this area will indicate that improved tests of auditory differentiating ability may be used diagnostically and prognostically in the rehabilitation of the brain-injured person.

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Differential Intensity Sensitivity In The Ear With Loudness Recruitment

James F. Jerger

Evidence has appeared, in recent years, suggesting that the ear with loudness recruitment is abnormally sensitive to small changes in sound intensity (*1*, *3*). The present study was designed in an attempt to confirm these findings by a comparison of the psychometric functions for differential intensity sensitivity in the normal ear and in the ear with hearing loss accompanied by loudness recruitment.

Design

The quantal psychophysical method (*5*) was used to obtain psychometric functions for differential intensity sensitivity at two sensation levels (10 and 40 db), at two frequencies (1000 and 4000 cps), in two groups of 10 subjects each. The first, or control, group consisted of 10 adults with normal pure-tone thresholds at both 1000 and 4000 cps. The second, or experimental, group consisted of 10 adults with normal thresholds at 1000 cps, but with varying degrees of hearing loss, accompanied by loudness recruitment, at 4000 cps.

The presence of this recruitment was verified, for each experimental subject, by means of a monaural loudness matching procedure.

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Apparatus and Procedure

Loudness Matching. Figure 1 shows the apparatus used for loudness matching. The dual-channel electronic switch alternately passed first a 1.5-second, 1000-cps tone through the upper channel, then a 1.5-second, 4000-cps tone through the lower channel. The resultant signal at the earphone was a train of 1.5-second short tones alternating in frequency between 1000 and 4000 cps. Each short tone rose from the time axis to maximum amplitude in 100 milliseconds.

The output from each channel passed through a series of two attenuators. The first attenuator had a range of 110 db in 1-db steps and was controlled by the experimenter. The second attenuator was controlled by the subject. In the 1000-cps channel this subject's attenuator had a range of 30 db in 1-db steps. In the 4000-cps channel, however, the range was 15 db in 0.5-db steps.

The method of adjustment was used throughout the loudness matching procedure. By means of his two attenuators, the subject first found his threshold for the 1000-cps tones, then for the 4000-cps tones. A loudness match was next made at each of three sensation levels of the 1000-cps tone, 10, 25, and 40 db. At each sensation level the subject adjusted his

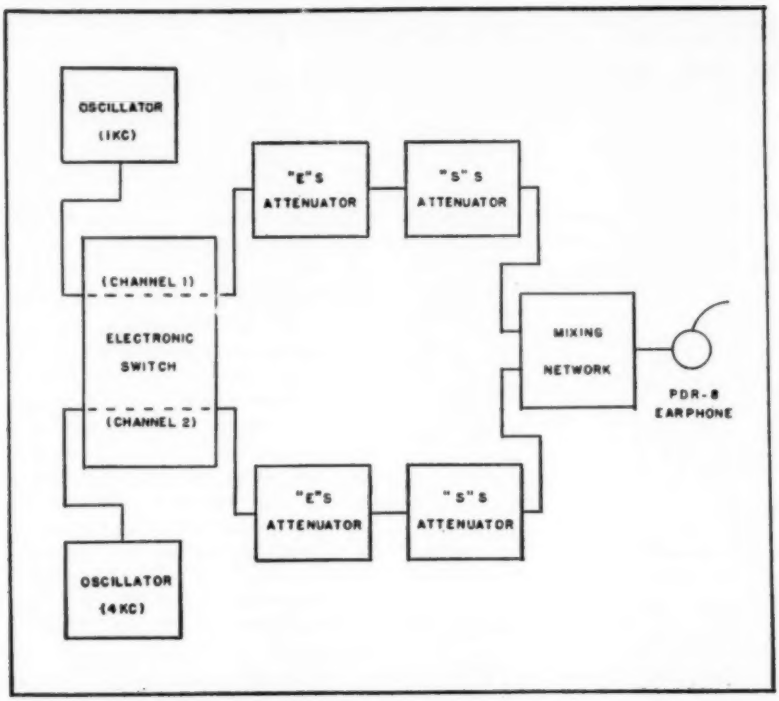

FIGURE 1. Block diagram of loudness matching apparatus.

4000-cps attenuator until the 4000-cps tones were equal in loudness to the 1000-cps tones. The actual experimental match at each sensation level was preceded by five practice matches.

In order to ensure that the subject's successive matches were not influenced by habituation to the same attenuator setting, the experimenter varied the level of his own 4000-cps attenuator randomly over a 10-db range on successive trials at each sensation level.

Differential Sensitivity. For the measurement of differential intensity sensitivity, the stimulus consisted of a continuous reference tone to which short intensity increments were periodically added. Figure 2 shows a block diagram of the apparatus used to produce this stimulus pattern. The output from an audio-oscillator was split into two sections. The upper section passed through one channel of the electronic switch, then through a standard 1-db step attenuator, finally to a mixing network. The lower section passed through a manual switch, then directly to the mixing network.

With the manual switch open, only the output from the electronic switch reached the mixing network and, ultimately, the earphone. The resulting train of short tones was used to construct the psychometric function for

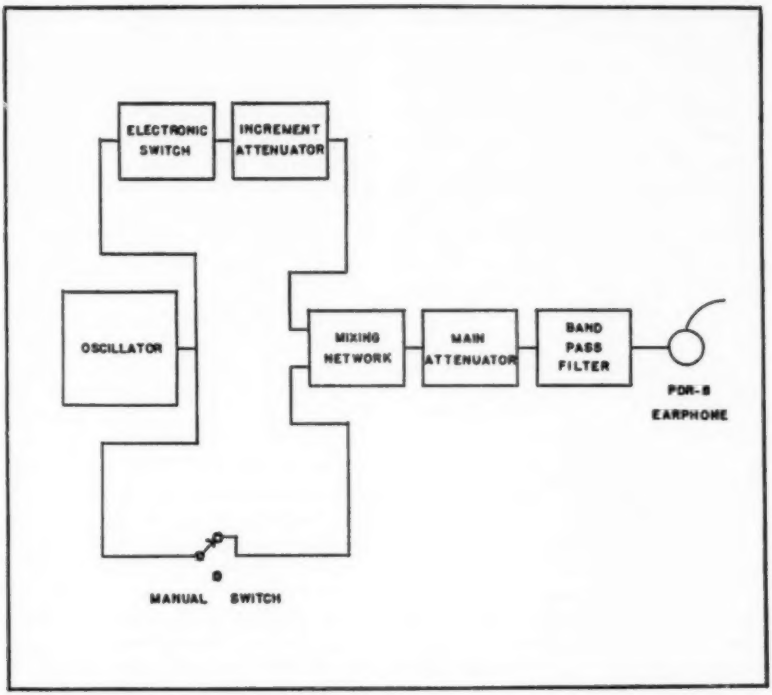

FIGURE 2. Block diagram of apparatus used to measure differential intensity sensitivity.

threshold prior to the measurement of differential sensitivity.

With the manual switch closed, the oscillator output was fed continuously to the mixing network. Under this circumstance the electronic switch output was mixed with the continuous tone, producing an intensity increment for the duration of the 'on period' of the electronic switch. Thus the output from the mixing network was a continuous pure tone to which short intensity increments were added at regular intervals. The phase angle between the continuous tone and the incremental tone was zero. This composite stimulus was used to construct psychometric functions for differential intensity sensitivity.

One short tone was passed by the electronic switch every 5.5 seconds. Each short tone rose from the time axis to maximum amplitude in 100 milliseconds, remained at maximum amplitude for 550 milliseconds, then decayed to the time axis in another 100 milliseconds.

The attenuator inserted in the upper line immediately after the electronic switch was used to control the magnitude of the intensity increment. The attenuator inserted after the mixing network controlled the level of the total signal.

Two experimental sessions, each about one hour in length, were required for all of the necessary measures of differential sensitivity. One

session was devoted to measures at 1000 cps, the other to identical measures at 4000 cps. Half of the subjects in each group were tested at 1000 cps during the first session, the other half at 4000 cps during the first session. Three psychometric functions were constructed in each session: first, the function for threshold; second, the function for differential sensitivity at the 10-db sensation level; third, the function for differential sensitivity at the 40-db sensation level.

It was decided that each of these functions should be based on no less than five and no more than seven observed percentages. Consequently, each psychometric function was obtained by presenting, to the subject, from five to seven successive stimulus sequences.

For the threshold psychometric function each sequence consisted of a train of 10 short tones. For the two supra-threshold functions each sequence consisted of a continuous two-minute tone to which 20 intensity increments were added. As noted above, both the short tones and the increments recurred at the rate of one each 5.5 seconds. The magnitude of all short tones, or increments, was constant within a sequence, but randomly varied over successive sequences.

The subject initiated each stimulus sequence himself by pressing a key when he was ready to begin. This action activated an interval timer which closed the circuit to the earphone for either one or two minutes depending upon whether threshold or supra-threshold differential sensitivity was being measured. The subject was instructed to press a button each time that he was *certain* he had heard either a sound (in the case of threshold) or a change in the loudness of the continuous reference tone (in the case of supra-threshold differential sensitivity). A high speed graphic level recorder was wired into the circuit in such a way that it simultaneously recorded, in temporal sequence, the output from the electronic switch and each pressing of the response button. The percent response to each short tone or increment magnitude was subsequently computed from this graphic record.

In each session the two sensation levels (10 and 40 db) were defined relative to the first 1-db attenuator step above an approximation to the 50% point of the subject's threshold psychometric function. This approximation to the 50% point was rapidly determined, immediately after the threshold sequences had been run, by plotting percent response against attenuation, in db. A normal probability integral was then visually fitted to these plots, and the point of 50% response was interpolated.

Results

Loudness Matching. None of the 10 experimental subjects experienced difficulty in making the required loudness judgments, but three of the 10 control subjects professed the procedure to be impossible, even after as much as one-half-hour of practice. Consequently, insofar as loudness matching is concerned, the control group consists of only seven subjects.

Figure 3 shows the mean loudness matches of these seven control subjects and the individual loudness matches for each of the 10 experimental subjects. The ordinate of this graph is the sensation level of the 1000-cps tone. The abcissa is the sensation level of the 4000-cps tone that was judged equal in loudness to the

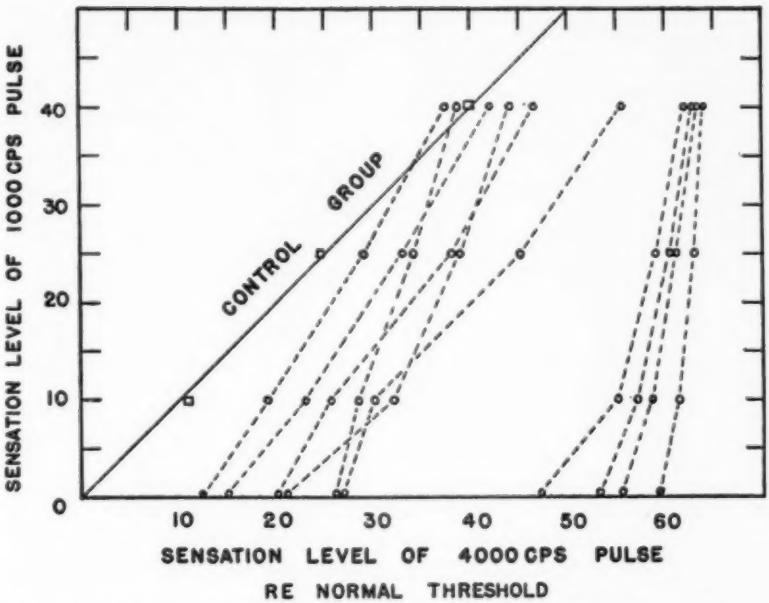

FIGURE 3. Curves showing relationship between growth of loudness at 1000 cps and growth of loudness at 4000 cps. The solid line represents the mean loudness matches of seven control subjects. The broken lines represent the individual loudness matches of 10 experimental subjects.

1000-cps tone. The three squares are the mean loudness matches of the seven control subjects at each of the three sensation levels of the 1000-cps tone at which loudness matches were made. The straight line drawn through them thus represents the loudness relationship between 1000 and 4000 cps when recruitment is not present. It can be seen that, for these particular control subjects, equal loudness increase was achieved by equal intensity increase at each of the three levels. Therefore, an increase in the slope of an individual function above 1.0 signifies that, at 4000 cps, the rate of growth of loudness is abnormally rapid. This is, by definition, loudness recruitment.

Figure 3 shows that each experimental subject showed some degree of loudness recruitment at 4000 cps, as indicated by a slope exceeding 1.

Differential Sensitivity. In order to analyze the results on differential sensitivity, both rectilinear and normal probability integral functions were fitted to each set of empirical percentages by the method of least squares. The data were then completely analyzed in terms of the results yielded by each type of function. The two sets of results led to identical interpretations, insofar as inter-group comparisons were concerned. In the interest of convenience of presentation, therefore, all subsequent results

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are reported in terms of the rectilinear fit.

All inter-group statistical comparisons were made by means of a non-parametric test due to Mann and Whitney (*4*). This is a rank-order method yielding an index of significance which is approximately normally distributed with zero mean and unit variance.

The mean absolute thresholds (50% points of least squares rectilinear threshold psychometric functions) for the control group were 11.5 db, at 1000 cps, and 10.8 db, at 4000 cps (sound pressure level, db re .0002 microbar developed in a standard 9A coupler). These values are approximately four db better than the National Bureau of Standards norms for the PDR-8 earphone.

In the experimental group the corresponding mean thresholds were 14.0 db, at 1000 cps, and 51.1 db, at 4000 cps. The 2.5-db difference between the two groups at 1000 cps was not statistically significant ($p = .36$). The 40.2-db difference, at 4000 cps, was, of course, highly significant. These results indicate that, at 1000 cps, pure tone thresholds for both groups were well within normal limits. At 4000 cps, however, pure tone thresholds were within normal limits for the control group but significantly reduced in the experimental group.

In order to subject the data on differential sensitivity to statistical analysis, four values were computed from each least squares function; the 0% point, the 50% point, the 100% point, and the slope. Table 1 shows the mean of each of these quantities for each group, at each frequency, at the 10-db sensation level. Table 2 presents the corresponding mean values at the 40-db sensation level. In each table the first column shows the results obtained in the control group, the second column, the results obtained in the experimental group, and the third column, the probability of obtaining the observed difference between the two groups under the null hypothesis. All probabilities are based on the non-parametric test cited above. Figure 4 illustrates the data in tables 1 and 2 graphically.

Examination of these tables and figures reveals that, at each sensation level, both groups yield essentially

TABLE 1. Mean rectilinear psychometric functions for differential intensity sensitivity at the 10-db sensation level. 0%, 50%, and 100% points are expressed in db. Slope is expressed in percent per 0.1 db. C—control group, E—experimental group, p—probability of obtaining the observed difference under the null hypothesis.

Frequency	*Measure*	*C*	*E*	*p*
1000 cps	0% point	.94	1.01	.568
	50% point	2.28	2.24	.880
	100% point	3.63	3.47	.998
	slope*	4.20	5.00	.302
4000 cps	0% point	.56	.51	.936
	50% point	1.81	.99	.012
	100% point	3.06	1.46	.002
	slope*	4.80	11.50	.0002

*Mean of individual slopes.

TABLE 2. Mean rectilinear psychometric functions for differential intensity sensitivity at the 40-db sensation level. 0%, 50%, and 100% points are expressed in db. Slope is expressed in percent per 0.1 db. C—control group, E—experimental group, p—probability of obtaining the observed difference under the null hypothesis.

Frequency	*Measure*	*C*	*E*	*p*
1000 cps	0% point	.54	.60	.308
	50% point	1.21	1.16	.624
	100% point	1.88	1.73	.290
	slope*	8.20	9.20	.132
4000 cps	0% point	.29	.19	.430
	50% point	1.05	.46	.008
	100% point	1.81	.74	.002
	slope*	7.60	25.00	.0008

*Mean of individual slopes.

equivalent results at 1000 cps, but markedly dissimilar results at 4000 cps. The basic difference between the two groups, at 4000 cps, is a significant increase in the *slope* of the psychometric function for the experimental group. Both groups appear to share a common 0% point, but, as a result of the increased slope in the experimental group, both the 50% and 100% points are significantly smaller in the experimental group than in the control group.

These results may be summarized as follows:

a. At 1000 cps, where both control and experimental subjects had normal acuity, inter-group differences in differential sensitivity were not significant.

b. At 4000 cps, where control subjects had normal acuity but experimental subjects had hearing losses accompanied by loudness recruitment, differential sensitivity, as measured by the quantal psychophysical method, was significantly better in the experimental group than in the control group.

c. At 4000 cps, the degree to which the mean psychometric function for experimental subjects fell below the mean psychometric function for control subjects was proportional to the percent response.

Discussion

Many previous investigators who have observed abnormally acute differential intensity sensitivity in the ear with loudness recruitment have attempted to explain the reduced difference limen as the inevitable corollary of an abnormally steep loudness function. In other words, as a result of the abnormally rapid rate of growth of loudness, a larger number of 'loudness units' are compressed into a given intensity span. Thus, it is reasoned, the just-noticeable change in loudness, at a given sensation level, will be achieved by a smaller intensity increment than would be required in the normal ear.

Certain observations made during the present experiment seem to argue against such a causal link between recruitment and abnormally acute differential sensitivity. These observations were concerned with changes in the apparent loudness of the reference

tone over the two minutes of sustained stimulation in each test sequence.

At the end of each experimental session the subject was asked whether or not the loudness of the reference tone appeared to change perceptibly during any two-minute sequence. Control subjects, as a group, reported

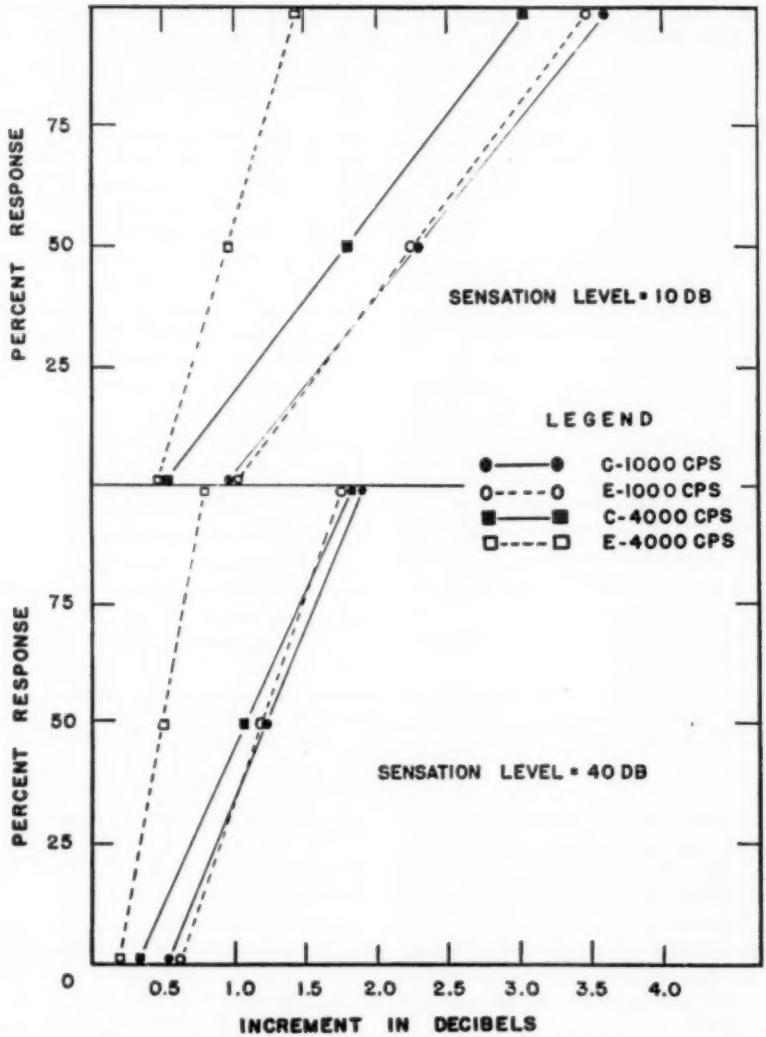

FIGURE 4. Mean rectilinear psychometric functions for differential intensity sensitivity. Each function is the mean of 10 individual functions.

no appreciable change at either sensation level of either frequency. Experimental subjects gave the same kind of report at 1000 cps. At 4000 cps, however, they all reported some decline in loudness during each test sequence. In the four subjects with the greatest degree of hearing loss at 4000 cps, the phenomenon was quite marked. Although the 10-db reference tone was quite loud at its onset, after as little as 20 seconds it had decayed to complete inaudibility. The 40-db tone never became inaudible to these subjects, but did appear to undergo an equally marked decline in loudness in the first 20-30 seconds. Experimental subjects with less hearing loss reported a similar, but less marked, decline in loudness.

These reports were not too surprising, in view of the recent work by Hallpike and Hood (*2*) on the phenomenon of abnormal loudness adaptation. A quite unexpected finding, however, was that differential intensity sensitivity seemed to remain essentially constant over the two-minute test sequences, in spite of the marked decline in loudness.

An index of the stability of differential sensitivity as a function of duration of sustained stimulation was obtained by constructing separate psychometric functions for the first and second minutes of each sequence. Both the 50% points and slopes were then analyzed to determine whether any significant difference could be found between the first and second minutes of sustained stimulation. No difference approached statistical significance. Intensity discrimination was as good in the second minute as in the first, in spite of the apparent decline in loudness of the standard.

It seems rather difficult to reconcile these findings with the assumption that recruitment causes heightened intensity discrimination by compressing a certain number of 'loudness units' into a smaller than normal intensity span. It would appear that the relation between these two phenomena is considerably more complex than this simple assumption implies.

Actually, it seems possible that loudness recruitment, per se, has very little to do with heightened differential intensity sensitivity. In view of the results described above one is led to suspect that the explanation for heightened differential intensity sensitivity in the ear with organ-of-Corti-type hearing loss is related, not to the shape of the loudness function, but to fundamental changes in that ear's response to sustained stimulation. At any rate, further study of the interrelationship between differential sensitivity and loudness adaptation seems indicated.

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The Effect Of Speaker Differences On The Intelligibility Of Phonetically Balanced Word Lists

John M. Palmer

The notion that hard of hearing individuals hear the voices of men 'better' or 'easier' than the voices of women has been comonly accepted. Such a notion has a very important effect, not only on speech reception testing but on subsequent therapeutic methods for the hard of hearing. Probably the most important question to be answered is this: 'Does the utilization of a single voice, usually male, in a testing situation, adequately and accurately measure the hearing loss for speech in a social sense?'

In 1929, Fletcher and Steinberg (*5*) discussed the differences between male and female voices. They reported that any differences in listeners' scores were due in part to the fact that women's voices were fainter and in part to the fact that they occupied higher frequency ranges than men's voices.

French and Steinberg (*6*) found that men's voices are about an octave lower in pitch than women's and the latter tend to be somewhat richer in higher frequency sounds. They concluded from this that the separate importance curves for the two types of voices would probably be shifted toward the lower frequencies for the male and toward the higher frequencies for the female. A similar report is made by Beranek (*1*) and by Crandall and Sacia (*3*). It appears, therefore, that there are some physical differences inherent in male and female voices which justify the notion that the hypacusic ear could hear and understand the two types of voices differently.

Carhart (*2*) states: 'Presumptively, therefore, a speech reception measure gives a relatively good estimate of the environmental handicap which accompanies a patient's auditory impairment.' Testing of auditory discrimination in the clinical situation has been added to basic speech reception testing; the latter technic utilizes spondaic words, the former the phonetically balanced (PB) word lists. Two methods of using the PB lists are in common practice: (1) determining the maximum discrimination or 'articulation' score, and (2) determining the threshold of intelligibility. This study is particularly interested in the second method.

If there is a real difference between the manner in which hypacusic ears hear and understand the voices of men and women, then there would be a reason for re-evaluating the testing procedure used in hearing clinics. Subsequent rehabilitation technics would be affected in that training

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procedures would require recognition of this difference.

The purpose of this study was to investigate the possibility of the existence of statistically significant differences in the intelligibility scores obtained for the voices of men, women, and children by: (1) hard of hearing subjects as a group, (2) normal hearing subjects as a group, (3) hard of hearing subjects classified as perceptive (nerve) type, and (4) those classified as conductive type loss.

Procedure

Nine trained speakers (three adult females, three adult males, and three 12 year old girls) recorded on magnetic tape three lists of 25 PB words each, plus 15 words randomly organized into three 45-word random test lists. Each 25-word list was organized by randomly selecting from the original 50-word lists. The three random test lists of 45 words each were selected in a similar fashion. Of the 45 words, different groups of five words were selected at random and assigned to each of the nine speakers; these assignments were also randomized. It was hoped that the care taken to randomize each selection process would make the speaker lists as nearly equal in original criteria as is possible in this shortened version.

A Magnecorder PT6 amplifier and transport mechanism recorded and played back the lists through a speech panel; this panel consisted of a Stromberg-Carlson amplifier, and a Stevens Tru-Sonic 15-inch speaker and a rigid diaphragm 'tweeter' speaker. Attenuation in one decibel steps, from one to 110 db, was possible. A VU meter was used for monitoring the stimuli. To insure equal intensity level administration and to equate the voices of males and females on an intensity basis, all tapes were re-recorded through a Gates SA-29A limiting amplifier.

The subject group consisted of thirteen hard of hearing individuals previously examined at the hearing clinic or an otologic clinic. Of this number, eight were males and five were females, ranging in age from 21 to 78. Typing these individuals according to hearing loss was based upon medical diagnoses as well as the results of standard audiometric practices such as pure tone air conduction and bone conduction thresholds, speech reception thresholds, and intelligibility scores. It was found that six of the subjects had a predominantly nerve-type loss and seven had a conductive-type loss.

The control group consisted of nine normal hearing young adults, carefully screened by means of pure tone audiometry and speech reception audiometry under the same conditions as the subject group.

Each subject listened and responded to each of the nine speakers at three intensity levels administered so that one level would always produce the maximum articulation score for the familiar PB words, another a score below 15 per cent correct, and a third score between the two others, not necessarily in that order. Plotted from these three points was an intelligibility function curve. The 50 per cent point of this curve was the 'Intelligibility Score' for this individual. Egan (*4*) has reported in tests of this type, 'The greatest sensitivity usually results when the testing conditions are so adjusted that scores near 50 per cent are obtained.' Because of this sensitivity, the intelligibility score has been used by some clinics in audiologic procedures. These intelligibility scores were the raw scores for later statistical

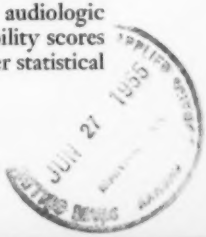

TABLE 1. Analysis of variance.

Subject Group	*Sum of Squares*	*Variance*	*Degrees Freedom*	*F*
Conductive				
Between Groups	136.04	68.02	2	
Remainder	1,221.94	58.18	21	1.17*
Nerve				
Between Groups	183.82	91.91	2	
Remainder	2,856.94	238.08	12	2.59*
Total Hard of Hearing				
Between Groups	261.39	130.70	2	
Remainder	17,272.84	442.89	39	1.69*
Normal				
Between Groups	168.62	84.31	2	
Remainder	616.79	25.70	24	3.28*

*Not significant at the 5% level.

treatment. All tests, including the random test, were presented and evaluated in the same manner.

Results

To determine whether there were differences operating between the groups when the total scores were considered, analysis of variance technics were utilized. Table I presents a summary of this treatment. It will be noted that of the *F* scores determined, none were at the level of significance (5 per cent) generally accepted as indicating a real difference between groups. Thus, the total group *F* score, 1.69, indicates that nowhere within the group were there differences large enough to warrant rejection of the hypothesis under investigation, i.e., hard of hearing individuals do not hear differently the voices of men and women. The same interpretation was made of the analysis of variance treatment of the two groups, conductive and nerve loss types. The *F* score for the conductive type loss group was found to be 1.17 and that for the nerve type loss group 2.59; neither of these scores indicated significant differences at the 5 per cent level. Thus, it appeared that in this group of hard of hearing individuals there were no real differences in the way in which they heard and understood the voices of men, women, and children when the intensity variable was controlled.

The normal hearing group presented a similar result; analysis of variance technics showed an *F* value of 3.28 for this group of subjects, a score which failed to reached the required 5 per cent level of significance. Again, apparently there are no real differences in the way normal hearing individuals hear the voices of men, women, and children when the intensity variable is controlled.

The results above are reported in terms of difference scores rather than in absolute intensity measurements. No effort has been made to analyze possible relationships between difference scores and threshold levels.

Summary

To determine the efficacy of a male plus female voice test (Random Test) for the intelligibility function of hard of hearing individuals, it was necessary to determine the presence or absence of any real differences in the way these subjects heard the various voices. In this investigation, the phonetically balanced word lists were used, since the threshold (50 per cent level) of these lists is an extremely sensitive point and is especially adaptable for use in comparative scoring procedures. The intelligibility score as herein defined is the intensity level at which 50% of the PB words were correctly identified.

In presenting recorded lists of words as read by men, women, and children, the intensity was carefully controlled by monitoring at the time of recording and by later re-recording the material through a limiting amplifier. The word lists were shortened by one-half to facilitate the administration of the tests; two hours were required to administer the tests as finally constructed.

The random test was constructed and administered with the single speaker tests so that, should the difference between speakers prove to be real, the random test would be an adequate and accurate means of determining the intelligibility score in a social sense. However, because no differences were found, its need was not seen nor was it further utilized in this study.

Because no real differences were found for male and female voices in the intelligibility scores of hard of hearing individuals, and because of the sensitivity of threshold measures with PB words, it appears that little doubt can be cast upon the clinical technic of testing hypacusic ears with male voices as stimuli. Whether the speaker is male or female, the acoustic differences do not contribute importantly to the test score. If one speaker achieves a different score from another, the examiner should investigate other aspects, especially the articulatory characteristics of the different speakers.

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The American Speech And Hearing Association

THIRTY-FIRST ANNUAL CONVENTION

November, 17-19, Hotel Statler, Los Angeles

Planning for the 1955 annual convention is well under way and the committee feels that a number of outstanding programs have been arranged. Members of the Association, particularly those who may not have visited the West Coast, are urged to make the trip to Los Angeles a 'must.'

As in past years, it has been the intention of the committee to arrange a program which will meet the varying interests of members of the Association. This year the basic areas to be covered are:

Stuttering—6 sections
Organic disorders of speech—10 sections
Hearing—14 sections
Experimental phonetics—6 sections
Functional articulatory defects—6 sections
Voice problems—4 sections
Professional problems—10 sections

Every effort is being made to provide a substantial number of sections whose focus will be on the problems of direct therapy for disorders of all types, but to balance these with a proportionate number of sections on fundamental research and theory in speech and hearing disorders and in experimental phonetics.

A number of special demonstrations in the areas of speech and hearing disorders have been arranged, utilizing, in some cases, specialists from the West Coast area. Several schools and rehabilitation centers in Los Angeles will be open for visits from members of the Association, including the John Tracy Clinic. In the field of organic disorders interesting sections on aphasia, including aphasia in children, are planned.

The deadline for submitting abstracts is now passed, but there is some possibility that a limited number of papers could be added. For this reason any member who did not submit an abstract earlier may do so now, provided he understands the circumstances under which the abstract is received.

Organizations and schools desiring to arrange special luncheons or open houses are reminded that the program committee would like to have notice of these so that program listings can be made.

We are hoping to meet you in Los Angeles!

THE PROGRAM COMMITTEE

Issues In Ethical Practice

Members have been invited to submit descriptions of cases involving behavior which to them seems (a) clearly ethical, (b) clearly unethical, or (c) doubtful. Here are some of the first contributions to be sent to the committee. Included with these cases are questions of ethical practice which they raise.

Administrative Practices

Case 1. Sometime ago an organization concerned with crippled children established a speech center. The center was staffed by two persons who were qualified to do routine therapy, but not to take full responsibility for a major speech and hearing clinic. In order to get around this difficulty, the organization approached this university center with the request that we act in an advisory capacity with respect to diagnosis and recommendation on severe problems. After about a year and a half of operation, we found that no use had been made of our advisory service other than to list it in publicity for the organization's speech and hearing center. We have asked that we not be listed in this manner in the future.

Case 2. A rehabilitation center, dependent upon Community Chest support and contributions, established a speech and hearing division and staffed it with a therapist just out of college. It was announced that cases accepted would be within the therapist's training, but she has found that she must work with any problem that comes to her, including aphasia, laryngectomy, etc. There is no supervision of her work by anyone trained to do so.

Is it ethical for a center to have a consultant in name only? Should an individual accept a cousultantship without an agreement regarding the nature and extent of his duties? To what extent should the therapist insist upon maintaining a type of program within the limits of his professional training? To what extent and in what ways should therapists have the support and help of ASHA for such problems involving relationships with employers who are not members of ASHA?

Case 3. A speech therapist in a public school complained to an administrator of being overburdened by too many cases and insufficient time for recording keeping, conferences, etc. The administrator told her she should ease her burden by 'cutting out the record keeping.' He stated, 'It's a waste of time to keep records in these cases. The records the teachers keep are sufficient.' The therapist explained the necessity of keeping special records for therapy and insisted on doing so. She offered to resign if conditions were not re-arranged so that she could do a good professional job of therapy. The administrator then made the necessary re-arrangements.

How far should a therapist be prepared to go in defense of ethical practice as he sees it? What other ways might be available besides the threat of resignation for solving such problems as described above? To what extent does the ethical aspect of a situation take the particular form it does in a person's thinking because of his personality dynamics? To what extent then could the problem be resolved by searching for a creative solution in terms of human relations?

Case 4. When I graduated with a bachelor's degree, I went to work as a therapist in a privately endowed speech and hearing center directed by a member of ASHA. At the time I was employed, many promises were made to me but no written contract was issued. When I arrived, my duties were quite different from those originally defined. I was told

that I would not receive the salary increase promised originally because I was a female, nor would I have the responsibilities as prescribed because of being a female. This was openly said to parents of clients and to my superiors.

What steps might have been taken by both employer and therapist to bring about an ethical solution in the situation described? To what extent should concern for a therapist's feelings of self respect and well-being be considered as an aspect of ethical practice by a superior? To what extent are such feelings inevitably bound to a therapist's efficiency of functioning? Does the tie-up between unethical practice and resulting inefficiency suggest a way of influencing employers who are not members of ASHA?

Case 5. I have the utmost confidence in my superior's ability to keep secret any information which I divulge professionally and for his benefit only. I also feel certain that he does not divulge his opinion of me to outside sources without my knowledge; also that when I make mistakes he and I are the only persons who know about them. Never is a report of an individual's work submitted to any other person without complete knowledge of the report first being made known to the person in question.

This example appears to describe a clear-cut case of ethical practice. There seems to be no doubt that such an attitude on the part of a therapist will increase his efficiency in functioning. To what extent could this in turn influence the supervisor's own efficiency in functioning? Might a conflict arise in cases where the supervisor is asked by his colleagues or supervisors for a confidential report on a therapist? In what ways might such a conflict be ethically resolved?

Relationships with Medical Profession

Case 6. The medical association in a community insists that all children referred by the speech therapist to a specialist, first be seen by the family physician. If the latter wishes, he will then refer the child to a specialist. There are some general practitioners in the community who do not make use of facilities for testing hearing loss, throat difficulties, etc. Some of these doctors have sent parents back to the speech therapist with a diagnosis of 'nothing wrong with the child,' when, for instance, two or three audiometer tests in school revealed serious hearing loss. The speech therapist, in some cases, is advising parents to go to an otologist, despite the general practitioner's pronouncements. The therapist is concerned about this, yet feels it is necessary for the sake of the children who, on the basis of evidence available to her, need a specialist's attention.

Should the therapist attempt to get the medical association ruling modified? Should she try to find a solution through communication with the individual doctors? Should she have help from her own professional association(s)?

Practices in Therapy

Case 7. A five year old girl with delayed speech was brought to a speech therapist. The child's speech consisted of grunts, cries, and gestures; she walked stiffly. The parent told the therapist that the child had had six months of private lessons with a practitioner (not a member of ASHA) in an adjacent community. The parent complained that the practitioner had required the child to sit on an adult-size wooden chair for a half hour at a time, while the practitioner made the child drill on sounds. He had put molasses around her lips and had her lick it 'for tongue exercise.' When the child finally began to have increasing temper tantrums at home, the parent suspected something was amiss and stopped the lessons, the fee for which had been $5.00 for 20 minutes. The therapist was informed that the practitioner had not requested the parent to take the child for an audiometer test or general physical check-up. No referral to a psychiatrist or psychologist had been suggested, yet it was later determined through medical and psycho-

logical examination that the child was mentally deficient and had a severe hearing loss. This practitioner has apparently convinced some medical doctors of his competence for they refer cases to him. A university has had him conduct a speech correction clinic. The therapist is frequently asked by people in the community whether this practitioner is competent. She refers them to the ASHA Directory for a list of certified therapists.

To what extent does a university lend implied sanction of such an individual's practices by having him on its staff in any capacity? To what extent should a university assume responsibility for having information about the professional practices of individuals in its region?

Case 8. The mother of one of my clinic students was willing for her daughter to attend speech clinic but was not willing to make the suggestion herself. She then related that her son had attended the speech clinic and that one day she had talked with his therapist confidentially about some of the boy's problems. The therapist had subsequently revealed this information to the boy and it had produced a strained relationship between mother and son. She stated that she did not want to run the risk of such a situation arising with her daughter.

When parents discuss their son's or daughter's problems with a therapist, is it ever ethical for the therapist to reveal these confidences to the client? If so, under what circumstances might this practice be justified?

Case 9. A speech therapist in a school system confided to a colleague that he did not bother to keep records except when he expected that the supervisor might ask to see them; then he did the minimum amount of recording on them. He also said he didn't bother to read the material in the pupil's cumulative folders for background on his therapy cases nor did he call case conferences on pupils who were making little or no progress because it was too much trouble to get everyone together.

This example appears to describe a clear-cut case of unethical practice. The issues involved appear to be those of how such behavior can be eliminated and how it may be prevented from occurring. How may this therapist be helped to realize the results of his behavior in regard to (a) the effect on the pupils, (b) the effect on the reputation of the speech department and (c) his own professional integrity and growth? Should the institution which trained this therapist be informed by his supervisor of his neglect of this aspect of his work? To what extent can training institutions assume responsibility for such behavior, i.e., can such tendencies be observed in students during the training period?

Case 10. A therapist remarked prior to class, 'What shall I do with them today? I guess we can fish again.'

To what extent does such behavior on the part of a therapist violate the spirit of ethical practice as it relates to responsibilities for the well being of clients? To what extent may such behavior, habitually practiced, undermine the confidence of the general public in the profession? To what extent can training institutions assume responsibility for such behavior, i.e., can such tendencies be observed in students during the training period?

Case 11. It is difficult for me not to become attached to some children and annoyed with others.

Does a therapist's awareness of feelings of 'attachment' and 'annoyance' constitute an ethical problem? Is an ethical problem involved if clients perceive rejection in a therapist's behavior in response to such feelings? What is the responsibility of training institutions in regard to the prevention of unethical practice in therapists? To what extent should they undertake to help therapists understand the dynamics of behavior—their own and others, and so control their

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behavior that it will not have an adverse effect on clients?

Case 12. It has been difficult for me to find time to follow a program of self-improvement in the field.

To what extent does this problem involve ethical issues in regard to making the best possible treatment available to clients and to increasing the respect of the general public for the profession. To what extent is it the responsibility of the director of a clinic or supervisor in a school system to make definite provision for staff members to follow a program of self-improvement?

Professional Training

Case 13. Three college students in professional training were having coffee one day in a restaurant. We were in a nearby booth and heard bursts of laughter and the words, 'speech clinic,' 'that boy is going to be the death of me yet,' 'his mother,' 'he said,' etc. We also were from the clinic and could understand that shop talk can be carried on with laughter and yet with deep seriousness and respect. People in other booths hearing it, however, might easily get a different impression.

What are the ethics in regard to occasion, time, and place in which to discuss cases? Many college students are not yet members of ASHA and hence have not pledged themselves to uphold the Code of Ethics. What ethical responsibility do their instructors have for exerting all possible influence on students to act in professional training as they will later pledge to act?

Relationships with the Press

Case 14. A newspaper article carried the headline, '——Speech Clinic cures 83% of stuttering cases.' Particularly offensive in this article, on the basis of reactions of several of us who have seen it, is the use of the word 'cure' and the use of a specific percentage. We feel that these two terms can create unfortunate complications.

May the word 'cure' be used ethically in connection with stuttering? What is meant by 'cure'? What kind of records do we need in order to be certain that any fixed percent qualify as cured? What steps should a therapist take to avoid misquotation? Can the therapist be held responsible for the total content of an article? Can the therapist be held responsible for the headline?

Send your contributions on the study of ethical practice to:

Ollie Backus, Chairman,
Committee on Ethical Practice
Box 2025, University, Alabama

Book Reviews

MOSES, PAUL J. *The Voice of Neurosis.* New York: Grune and Stratton, 1954. Pp. 131. $4.00.

The author, an otolaryngologist in the Stanford University School of Medicine, advances the thesis that through voice analysis alone the neurotic pattern of an individual can be discovered. He advises the otolaryngologist to move further into psychiatry and psychotherapy and believes that the psychiatrist should give more attention to the voice in diagnosis. The book represents an attempt to 'fill a gap related to these fields as well as to the realms of the speech and voice teacher.'

Beginning with the chapter, *Fundamentals of Vocal Analysis,* the author decries the use of 'intuitive judgment' in analyzing the voice and declares (p. 8): 'Medical analysis of the voice requires more precise tools than intuitive response. Something objective, something which can be verified by others, must be found. Before attempting to analyze voice, one must divorce it from the message it seeks to convey and release it as far as possible from the bondage of subjective association.' As we read on, however, we find that intuitive judgment is really the basis of the author's system of analysis. He states (pp. 11-12) that in making an 'acoustic examination' of the voice and in drawing the right inferences, the listener must acquire 'creative hearing'; that is, he must have a sort of kinesthetic empathy in which he tends to imitate that which is perceived. Moses calls it an 'audiokinetic method' of examination. Although he emphasizes that 'creative hearing' is not the same as intuition, he seems to be making a distinction without a real difference.

From the outset it is clear that the author is not talking about speech but is concerned only with the interpretation of personality structure through laryngeal activity and resonation. It is difficult to see, however, why anyone would want to eliminate the verbal content from communicative patterns when trying to understand the nature of the person speaking. The author seems to contradict his own basic point of view when he states (p. 11): 'Grasping the whole of a phenomenon is essential in the scientific approach. The whole is a firm anchor to reality. Parts have no life and no meaning without it.'

In his process of reading neurotic and psychotic patterns through voice analysis, the author seeks first to isolate elements of the voice, and then to describe these elements in 'measurable or other unambiguous, verifiable terms.' He attempts to trace the influences which shape observed variations, and finally directs attention to the integration of these parts into meaningful patterns.

In the chapter entitled, *Vocal Ontogenesis,* the theory is posited that developing vocal patterns reflect the early emotions and anxiety neurosis of the child. The heart of the book, however, seems to be the material in the chapter, *Acoustic Dimensions of the Voice,* in which are presented the vocal attributes upon which this analysis system is based. They are: respiration, range, register, resonance, rhythm, melody, intensity, speed, accents, and emphasis. Added to these are 'other significant features': pathos, mannerism, melism, exactness, and pauses between words. The first ten elements the author declares to be measurable (p. 31). He further states that 'the trained listener can clearly identify and isolate them, and the observations of all trained listeners will coincide within close margins of error.'

The last two chapters are entitled: *Areas of Interpretation in the Neurotic Personality* and *Vocal Features of Neurosis.* 'Neurosis in itself is voice-bound,' states the author (p. 83). 'One can safely say that the majority of neuroses has an almost characteristic vocal expression.' Here the book takes up drives and traits which the author says figure prominently in interpreting vocal features of neurosis and psychosis. A number of brief case histories are sketched and even the subject of *Ventriloquism* is treated.

We will not question the idea that there is probably a vocal equivalent of all psychological and physiological states in the individual and that the emotional history of the individual is probably one of the im-

Book Reviews is edited by Kenneth Scott Wood, University of Oregon.

portant determinants of vocal patterns. Whether or not patterns of personality can be adequately determined from them on the basis of correspondence between vocal factors and personality factors is the central question. It is not difficult to see from clinical experience that most voice problems are psychologically tinged, but neurotic factors probably determine just as much what one says, whether or not he says it, what words he uses, how much he says, and how clearly he articulates.

There is a paucity of scientific research findings concerning the correlation between vocal expression and personality. Some work, notably that of Fairbanks and Pronovost, Fairbanks and Hoaglin, and Hebb, has been done in comparing judgments of observers listening to simulated emotional expression. More work has been done in the study of personality and facial expression. Discriminations among the many types of emotions and attitudes that we think we observe in people's speech is difficult enough with all the cues present; but when we eliminate such things as facial expression, gesture, verbal content, and the knowledge of the stimulus situation, we have in voice alone a very slender thread upon which to hang a personality diagnosis. When we add to this the idea that the voice as well as all the attributes of speech often function to conceal personality disturbances, it complicates still further the matter of reading-out neurotic patterns.

Though it is not a scientific book, it does make interesting and stimulating reading. There are many nuggets scattered through it, and many points well taken and well stated. In the main, it contains too many unexplained terms, undeveloped ideas, and flat assertions. It is highly imaginative and at times extremely nebulous in its quasi-psychoanalytic treatment of the voice. It does not present any research data as a basis for the many assertions it contains, and it is self-contradictory in many places.

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MYKLEBUST, HELMER R. *Auditory Disorders in Children: A Manual for Differential Diagnosis.* New York: Grune and Stratton, 1954. Pp. 367. $6.00.

It is generally assumed that audiologists are concerned only with problems of hearing testing and with the habilitation and rehabilitation of children and adults who have impairment of their sense of hearing. A little known but important function of the audiologist, however, is to determine when the sense of hearing is not impaired—when a language disorder is not due to deafness. Conditions which, because of their effect on language development, are frequently confused with deafness are brain injury (aphasia), psychic or psychological disturbances, and mental retardation. Because children with any of these conditions may behave as if they do not hear normally, it is correct to consider such disabilities, along with actual hearing impairment, as being 'auditory disorders.' It is the responsibility of all professional people who work with children presenting language dysfunctions to recognize the differentiating characteristics of the various types of auditory disorders. It was in an effort to assist all such professional people in making a differential diagnosis that Helmer Myklebust wrote *Auditory Disorders in Children.*

In this book, Dr. Myklebust sets forth a procedure for differential diagnosis adapted for use with children between the ages of one and six years. The rationale of the book is stated in Chapter One: 'Hearing can be evaluated adequately only when it is considered in relation to the child's total development and behavior . . . . The diagnostician who oversimplifies auditory functioning and assumes a direct relationship between inadequate response to sound and impaired acuity will erroneously diagnose certain children as deaf. Such a diagnosis can be made with assurance only after other conditions which simulate deafness have been carefully considered and differentially eliminated.'

The book is divided into five parts. Part One is the introduction, and Part Five contains illustrative material in the form of case studies from the files of the Children's Hearing and Aphasia Clinic at Northwestern University, of which Dr. Myklebust is the director. Part Two is concerned with the importance of taking a careful case history, and with the interpretation of the information thus obtained in terms of making an inferential diagnosis and determining the presumed etiology.

Part Three of the book deals with the behavioral symptomatology of children who present problems of auditory disability. This section is divided into four chapters, one on each of the disorders of peripheral deafness, aphasia, psychic deafness, and mental deficiency. In this section, Dr. Myklebust

enumerates specific items of observed behavior which differentiate children in one of these groups from children in any of the others. This section grows out of the author's own extensive clinical experience, and he frankly states that the documentation of much of the section is on a purely empirical basis. The behavior characteristics of each of the four types of auditory disability is contrasted in respect to the child's vocalizations, his use of gesture, his response to sound, his emotional expression, his sensitivity to visual clues and tactile sensation, his motor behavior, his social perception, and his emotional adjustment.

Part Four of the book is concerned with examination methods and procedures. Dr. Myklebust believes that the examination of auditory capacity should be based more on informal procedures, such as controlled observation, than on the usual formal audiometric tests. The next part of the testing procedure is the psychological examination, which includes the areas of social maturity, mental development, motor functioning, and emotional development.

This book represents an important contribution to the field of audiology. It is the first attempt to present a systematic approach to differential diagnosis of children with 'auditory disorders.' In attempting to enumerate specific details of differentiation, the book is of course subject to the criticism that it is not all-inclusive. Anyone with extensive clinical experience can recall patients whose responses were not the ones generally expected from a particular disability. Naturally, in a work of this sort, it is impossible to mention all of the exceptions to the general items of differentiating information presented. One other criticism seems valid: although the author recognizes that a child may present a combination of problems, the organization of the book is based on the assumption that a particular child exhibits one of four possible syndromes — peripheral deafness, aphasia, psychic deafness, or mental retardation. If children actually could be classified as being only in one or another of these four categories, the business of differential diagnosis would be greatly simplified.

There are those who will argue with some of the specific concepts of the book, but it is this reviewer's opinion that clinicians generally will welcome the book for the contribution it makes in chronicling differential items of case history, behavioral symptomatology, and test results of children presenting problems of auditory disability which may or may not be due to peripheral hearing impairment.

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HOPKINS, T. W., H. V. BICE, AND K. C. COLTON. *Evaluation and Education of the Cerebral Palsied Child: New Jersey Study*. Washington, D. C.: International Council for Exceptional Children, 1201 16th Street, N.W., 1954. Pp. 114. $1.60.

The foreword to this study, by Winthrop M. Phelps, points out the growth and development of understanding and knowledge of cerebral palsy over the past decade. 'The authors,' he says, 'have been cognizant of these dynamic changes.' He believes that 'the approach to the data has been scientific and that the results are authentic as far as current information permits.'

The introduction reviews the history of the New Jersey State Education program relative to the education of children with serious physical handicaps, making special reference to those children who have cerebral palsy. Also given is the source of the 1,505 cases whose records are the bases for this study. Of these, 1,406 cases are termed the State group and 99 cases are the A. Harry Moore School group.

The first observation from the findings of this study which the authors term significant is 'that while birth injury is the major single cause of brain damage in cerebral palsy, it is the causal factor in only 38.9% of the 1,105 cases reported in this study.'

Analysis of the two groups disclosed that the ratio of spastics to athetoids was two to one; 21.8% of the spastics and 75% of the athetoids were quadriplegias, while 47.3% of the spastics and 10.9% of the athetoids were hemiplegias.

In the A. Harry Moore group, 3.6% exceeded 110 on intelligence tests. The median IQ for spastics was 79 and for athetoids 88.

Educational Therapy and Training, the main topic of the book, occupies 25 pages. Education is defined as satisfactory development of the whole child. Educational therapy is explained as 'that part of the educational process which is directed toward the discovery and application of methods designed to ameliorate or overcome certain learning disabilities which are commonly found among those who have suffered an injury to the brain. Thus, the term therapy

is no longer limited to the purely medical aspects of the problem.'

The authors stress the important role of the teacher of cerebral palsied children. They point out that complete physical diagnosis and psychological analysis are essential as backgrounds for the educational program. The program must provide the three determinants of learning — opportunity, guidance, and success.

Though the authors stress physical, occupational, and academic therapy, and even mention vocational programs, no mention is made of speech therapy. However, in the list of special teachers (not in the medical department) one speech correction teacher is given. The importance of a speech program is mentioned later.

There is a short discussion on clinic and classroom problems. The primary aim of this phase of the program is to adjust the child emotionally, and to ascertain the reason for his failure to achieve academic success in a regular school program and in what ways he can be helped.

The material presented under *Special Educational Methods and Typical Results* seems to leave out the roles of occupational therapy, and speech therapy. Hand-eye coordination and speech and vocabulary development are allocated to the educational therapist.

The chapter, *Integration of Services*, leads one to hope that true 'team work' is the rule. As one reads here, however, he is impressed with the dominant role the educational therapist *always* plays. This is not *team* approach!

On the whole, this booklet indicates that New Jersey is seriously concerned with the problems of the cerebral palsied; the A. Harry Moore School is to be congratulated on a forward moving program for these children.

BERNEICE R. RUTHERFORD.
Saint Paul Rehabilitation Center

BARBARA, DOMINICK A. *Stuttering: A Psychodynamic Approach to Its Understanding and Treatment.* New York: The Julian Press, 1954. Pp. 304. $5.00.

The author, a psychiatrist and a former stutterer, has attempted to combine his own formulations of the stuttering process with Karen Horney's theory of neurosis. As the title suggests, the author's concepts of stuttering are based on a psychoanalytical framework. According to the author, the stutterer is a neurotic. He is no different from other neurotics, except in his particular experiences and responses. His environment, like that of other neurotics, has lacked warmth, love, and respect, leading him to feel weak, insecure, and shaky. The neurotic stutterer loses his self-esteem and is weakened at the core. In his attempt to regain unity of self, he creates an idealized image of himself. He feels that he is a great orator and can hold audiences spell-bound. This particular idealized self-image is labeled the 'Demosthenes Complex.' The person who stutters makes unrealistic demands (neurotic claims) upon others. He feels that society should grant him special privileges since society has punished him so. His most excessive demands are upon women. The factor of self-hate, brought about by the inability of the stutterer to meet his own demands, is an important factor in the stutterer's personality make-up.

The author believes that with most children the speaking situation is one in which they can convey opinions and attitudes, but with the stutterer it becomes identified with fear and hostility. The stutterer feels bound to fail and his attention shifts from *what* to say to *how* to say it. As his anxiety increases, he becomes more rigid in his behavior.

Dr. Barbara says that there are three major ways in which neurotics attempt to solve their inner conflicts: self-effacement, expansiveness, and detachment. The self-effacing stutterer (most common) shuns pride and is afraid of being in a superior position. He idealizes himself by becoming a martyr. Actually, he has a great deal of hostility which he is covering up. The expansive stutterer (least common) is very narcissistic and wants vindictive triumph. He feels his words are most important. Detachment occurs when the stutterer feels defeated and begins to withdraw from any situation which might challenge his perfect image of himself. These attempts to cope with his problems have five consequences: (1) the stutterer will hesitate in most other aspects of living; (2) he is inert and cannot direct himself toward any goal; (3) he is constantly fatigued by the misdirection of psychic energies used up in his conflicts; (4) he is generally ineffectual; and (5) he loses any sign of hopefulness.

The author's therapy for primary stutterers involves making the parents aware of ways to lessen tension. It is best to have the parents in psychoanalysis, or if not, the

author would give specific instructions to parents on such points as improving the general health of the child, and encouraging in the child a sense of confidence and mutual love. Therapeutical techniques for older stutterers are discussed under the headings of the initial interview, working with resistances, areas where blockages are predominant, end stages of treatment, dreams, and group therapy.

The reader receives the general impression that Dr. Barbara's concepts of stuttering are extreme and over-generalized. Even if it were true that many stutterers are neurotic, it is doubtful that all have these particular conflicts or that the conflicts are as severe as the author describes them. It would be difficult to test many of his postulates.

The continuity throughout the book is weak. Chapter Three, a study of stuttering in psychotics, is introduced very abruptly and has no apparent relationship with the chapters preceding and following it. In the first two chapters the author quotes liberally from Johnson, Greene, and Hahn but does not adequately tie together the ideas from these sources.

Too little is presented on therapy. After the great detail with which the author presents each of the processes in the stutterer's neurotic development, the reader may look hopefully to the chapter on treatment, only to find such sentences as this: 'A detailed presentation of treatment in stuttering is too highly specialized a task for one chapter.' Furthermore, the book gives many instructions to parents which are no different from the general suggestions outlined by speech therapists and other writers.

Several small items seem bothersome such as the use of an old and confusingly presented dichotomy between stuttering and stammering, and excessively long quotations. The most disturbing factor in the author's style is his redundancy.

The main contribution of the book lies in the detail used in explaining the underlying dynamics involved in stuttering *as interpreted by a psychoanalyst*. Although he presents few new concepts, he relates neurosis to stuttering in a definite way. The *Demosthenes Complex*, a new name for the compensatory behavior previously observed by many, has never before been explained in this manner.

The book is well worth reading. It is probably not suitable for a text, but might be used as collateral reading for advanced students. Students not having a good background in stuttering or in theories of personality should be cautioned because of the tendency of the author to over-generalize and to state theoretical postulates as facts.

HAROLD L. LUPER.
University of Georgia

CARTIER, FRANCIS A. *The Phonetic Alphabet*. Dubuque, Ia.: William C. Brown Co., 1954. Pp. 58. $1.50.

Although the table of contents lists 16 different topics, this spiral-bound workbook deals with six major aspects of phonetic transcription. These are: learning the phonetic alphabet by transcribing easy-to-difficult words; reading words from phonetic transcriptions; transcribing sentences in connected speech; adding symbols for intonation to transcriptions; using phonetic modifiers for narrow transcriptions; and drilling on foreign words which are transcribed from French, German, Spanish, Portuguese, Italian and Icelandic.

Each of these areas is introduced by a page or two of terse explanation or instruction. The first two pages are devoted to advice to the instructor and students. Tables follow showing the vowels, diphthongs, and consonants. Drill materials proceed from the easy to the more difficult, as do the major divisions of the workbook. Each page of exercises is perforated so it may be torn out easily.

Cartier's workbook has two purposes: to help the instructor teach the phonetic alphabet, and to guide the student while learning phonetics on his own or to refresh his memory without classroom instruction. In using this workbook the first purpose would certainly be realized. However, since the study of speech sounds and phonetic transcription is usually more bewildering than the novice realizes at first, it is probable that the beginner will need an instructor's help while going through the explanations and exercises.

Moreover, while intonation is important, another significant aspect of American speech is stress and unstress. The latter is treated under assimilation, but should have been given a lengthier treatment.

This attractive and compact workbook will be valuable. Teachers will find it a practical supplement which can be easily adapted to classroom needs. Students will discover that its many exercises will test their knowledge of phonetics.

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As the author says: 'This workbook will be particularly valuable for use with those students who manage somehow to get into an advanced phonetics or speech correction course with insufficient background in the phonetic alphabet.'

K. E. MONTGOMERY.
University of Oregon

COURVILLE, CYRIL B. *Cerebral Palsy*. Los Angeles: San Lucas Press, 1954. Pp. 80. $2.50.

This is a brief introduction to the history, etiology, and pathology of cerebral palsy, with notes on the resultant clinical syndromes and their treatment. The author is professor of nervous diseases in the College of Medical Evangelists.

The chapter on pathology is liberally illustrated with photographs showing types of brain deformation.

Material on speech disturbances associated with cerebral palsy is limited to two paragraphs and three short references.

EGAN, MARGARET E., ed. *The Communication of Specialized Information*. Chicago: American Library Assoc., 1954. (University of Chicago Studies in Library, Science) Pp. 128. $4.00. (Photolith.)

This is a collection of papers presented before the Seventeenth Annual Conference of the Graduate Library School of the University of Chicago in 1952.

There are ten papers dealing with the following subjects: Problems of specialized communication in modern society; new patterns in scientific research and publication; distribution-acquisition problems in technical reporting; organizing and servicing unpublished reports; restricted dissemination of information and its social implications; implications for professional and organization training; contemporary trends in the production and use of social data; the use of social data by business, industry, and finance; a case study of specialized communication in industrial relations; and a new institutional structure for the dissemination of specialized information.

HATHAWAY, WINIFRED. *Education and Health of the Partially Seeing Child*. New York: Columbia University Press, 1954. (3rd ed., Pub. for the National Society for the Prevention of Blindness.) Pp. 227. $3.75.

The purpose of this book was to set forth the principles underlying educational procedures and health services for partially seeing children, and to present ways and means by which educational opportunities may be provided for them in both urban and rural areas.

The book includes materials on the history of work with the blind, selection and preparation of teachers, equipment of classrooms, methods of teaching, community relationships, and suggested special equipment for teaching.

HOLSOPPLE, JAMES Q. AND FLORENCE R. MIALE. *Sentence Completion: A Projective Method for the Study of Personality*. Springfield, Ill.: Charles C. Thomas, 1954. Pp. 177. $5.50.

The technique of psychological interpretation of projection through the completion of 73 sentences is analyzed by the authors sentence-by-sentence from actual case responses. The test was constructed by the authors, and 27 illustrative records are drawn from a group of subjects which include psychiatric patients, healthy adults of average and superior intelligence, children, and occupational groups.

The first three chapters deal with the rationale, development, and characteristic completions of the sentences, and the rest of the book presents interpretations of specific cases.

Current Publications

AHRENDT, WILLIAM R. *Servomechanism Practice*. New York: McGraw-Hill Book Co., 1955. Pp. 356. $7.00.

ALLPORT, FLOYD H. *Theories of Perception and the Concept of Structure*. New York: John Wiley and Sons, 1955. Pp. 731. $8.00.

BECK, SAMUEL J. *The Six Schizophrenias: Reaction Patterns in Children and Adults*. New York: American Orthopsychiatric Assoc., 1790 Broadway, 1954. (Res. Monograph No. 6.) Pp. 246. $5.00.

BLUM, LUCILLE H. and others. *A. Rorschach Workbook*. New York: International Universities Press, 1954. Pp. 170. $2.00.

BOTTRELL, HAROLD R. AND RUSSELL H. BROADHEAD, eds. *Educational Sociology: A Resource Book for Teachers and Community Workers*. Harrisburg, Pa.: Stackpole Co., 1954. Pp. 473. $5.25.

BRODNITZ, FRIEDRICH S. *Keep Your Voice Healthy: A Guide to the Intelligent Use and Care of the Speaking and Singing Voice.* New York: Harper and Brothers, 1953. Pp. 234. $3.50.

CALLIS, ROBERT, and others. *A Casebook of Counseling.* New York: Appleton-Century-Crofts, 1955. Pp. 361. $5.00.

CANNON, MYRTLE H. *Your Voice is You: A New Method of Voice Training.* New York: Exposition Press, 1955. Pp. 47. $2.50.

DELAFRESNAYE, J. F., ed. *Brain Mechanisms and Consciousness.* Springfield, Illinois: Charles C. Thomas, 1954. Pp. 564. $8.50.

DEUTSCH, FELIX, AND WILLIAM F. MURPHY. *The Clinical Interview: Diagnosis, a Method of Teaching Associative Exploration.* (Vol. 1) New York: International Universities Press, 1954. Pp. 613. $10.00.

DUNBAR, HELEN F. *Mind and Body: Psychosomatic Medicine.* (rev. ed.) New York: Random House, 1955. Pp. 311. $3.50.

DURKIN, HELEN E. *Group Therapy for Mothers of Disturbed Children.* Springfield, Ill.: Charles C. Thomas, 1954. Pp. 144. $3.50.

EDWARDS, ALLEN L. *Statistical Methods for the Behavioral Sciences.* New York: Rinehart and Co., 1954, Pp. 559. $6.50.

FLESCH, RUDOLF F. *Why Johnny Can't Read —and What You Can Do About It.* New York: Harper and Brothers, 1955. Pp. 231. $3.00.

GLOVER, EDWIN. *The Technique of Psychoanalysis.* (rev. ed.) New York: International Universities Press, 1955. Pp. 414. $7.50.

GOLDSTINE, DORA, comp. *Expanding Horizons in Medical Social Work.* Chicago: University of Chicago Press, 1955. Pp. 282. $5.00.

HESTER, KATHLEEN B. *Teaching Every Child to Read.* New York: Harper and Brothers, 1955. Pp. 427. $4.00.

HOIJER, HARVEY, ed. *Language in Culture: Conference on the Interrelations of Language and Other Aspects of Culture.* Chicago: University of Chicago Press, 1954. Pp. 297. $4.50.

LITTLE SAMUEL C. *Abnormal Movements of the Face: With Special Consideration of Abnormal Facial Movements Occurring in Paroxysmal Disorders.* University, Ala.: University of Alabama Press, 1954. Pp. 70. $2.00.

LUPS, S. AND A. M. F. H. HAAN. *The Cerebrospinal Fluid.* Houston, Tex.: Elsevier Press, 1954. Pp. 344. $9.50.

MEEHL, PAUL E. *Clinical Versus Statistical Prediction: A Theoretical Analysis and Review of the Evidence.* Minneapolis: University of Minnesota Press, 1954. Pp. 159. $3.00.

MONRAD-KROHN, GEORG H. *Clinical Examination of the Nervous System.* (10th ed.) New York: Harper and Brothers, 1954. Pp. 468. $7.50.

Psychoanalysis and the Social Sciences (vol. 4). New York: International Universities Press, 1955. Pp. 295. $6.00.

SARGENT, F. PORTER. *Directory for Exceptional Children.* Boston: Porter Sargent, 1954. Pp. 96. $1.10.

SCHRAMM, WILBUR. *The Process and Effects of Mass Communication.* Urbana, Ill.: University of Illinois Press, 1954. Pp. 586. $6.00.

SHERMAN, THEODORE A. *Modern Technical Writing.* New York: Prentice-Hall, Inc., 1955. Pp. 424. $6.35.

Sponsored Research Policy of Colleges: A Report of the Committee on Institutional Research Policy. Washington, D. C.: American Council on Education, 1954. Pp. 101. $1.50.

STEIN, MORRIS I. *The Thematic Apperception Test: An Introductory Manual for Its Clinical Use with Adults.* Cambridge, Mass.: Addison-Wesley Press, 1955. Pp. 383. $6.50.

TABER, CLARENCE W. *Cyclopedic Medical Dictionary: Including a Digest of Medical Subjects.* (6th ed.) Philadelphia: F. A. Davis Co., 1954. $4.75.

WATSON, ROBERT I. *Psychology as a Profession.* Garden City, N. Y.: Doubleday and Co., 1954. Pp. 75. $0.95.

Abstracts

BÉKÉSY, G. V. Paradoxical direction of wave travel along the cochlear partition. *J. acoust. Soc. Amer.*, 27, 1955, 137-145.

'The cochlear partition of the ear exhibits a strange phenomenon: waves produced by continuous sinusoidal stimulation may travel toward the vibrating source. A mechanical model was constructed which showed the same vibration pattern as the cochlear partition of the ear and the same paradoxical traveling direction. By stimulating various sections of the model it was possible to show how the traveling waves are formed and why their direction of travel is independent of the location of the driving source. This independence makes it clear why an over-all vibration of the bony walls of the capsule during hearing by bone conduction produces the same sensation as the transmission of the vibrations through the stapes.' (Author's precis)

CARTERETTE, E. C. Perstimulatory auditory fatigue for continuous and interrupted noise. *J. acoust. Soc. Amer.*, 27, 1955, 103-111.

The fatiguing effects of continuous thermal noise at four sound pressure levels and of interrupted noise at five different rates of interruption were measured. Observers balanced a fatiguing noise with a comparison noise to obtain median plane localization of the combination during the presentation of the fatiguing stimulus (perstimulatory fatigue). It was found that fatigue reached a maximum value at some time after the seventh minute. Maximum fatigue was an increasing, positively accelerated function of the noise intensity. Recovery was very rapid, and was virtually complete in two minutes. All interrupted rates of stimulation showed less fatigue than the continuous fatiguing tone. The higher the rate of interruption the greater the fatigue. The results are related to Hood's findings concerning the fatiguing effects of pure tones, and to other relevant psychophysical and neurophysiological evidence. (*W.R.T.*)

DOLANSKY, L. O. An instantaneous pitch-period indicator. *J. acoust. Soc. Amer.*, 27, 1955, 67-72.

A method for obtaining instantaneous indication of the beginnings of individual pitch periods of a speech wave is described. Instead of using linear filtering to extract the indicating pitch pulses, non-linear techniques are used with a variable time-gating circuit. This special 'blocking' circuit is said to eliminate spurious indicating pulses caused by pronounced second peaks in the pitch period. Although 100 per cent correct operation is not claimed, faster speech wave form studies are said to be made possible.

(*W.R.T.*)

EGAN, J. P. Perstimulatory fatigue as measured by heterophonic loudness balances. *J. acoust. Soc. Amer.*, 27, 1955, 111-120.

The influence of the method of measurement of perstimulatory fatigue upon the results obtained is investigated. In particular the problems presented by the method of simultaneous dichotic loudness balance are examined. 'Two principal conditions were compared. In the first, the frequency of the comparison stimulus was the same as that of the fatiguing stimulus. In the second, the comparison and fatiguing stimuli differed sufficiently in frequency so that the listener always heard two pure tones which he could correctly localize in the two ears.' The author concludes that the process of localizing the sound in making the simultaneous loudness balance is not critical to the occurrence of perstimulatory fatigue (*W.R.T.*)

Abstracts is edited by Dorothy Sherman, Ohio State University, assisted by the following committee: Asa J. Berlin, Pennsylvania State University; Virginia B. Carroll, Minneapolis Veterans Hospital; Frederick L. Darley, State University of Iowa; Inez E. Hegarty, Mt. Holyoke College; Parley W. Newman, Utah State Agriculture College; John J. O'Neill, Ohio State University; Jean Parker, Iowa City; Maryjane Rees, Sacramento State College; Frank B. Robinson, Miami University; Vivian I. Roe, University of Indiana; George H. Shames, University of Pittsburgh; Joseph Sheehan, University of California; Barbara S. Street, Minneapolis Veterans Hospital; Wayne Thurman, Eastern Illinois State Teachers College; William R. Tiffany, University of Washington.

HUGHES, J. R. Auditory sensitization. *J. acoust. Soc. Amer.*, 26, 1954, 1064-1070.

The author tests the hypothesis that a low frequency tone will produce auditory *sensitization*. To determine the presence of this effect, seventeen subjects were tested before and after exposure to a one minute 500-cycle tone of 122 db SPL on a Békésy type audiometer. It was found that all but one subject showed sensitization. This effect reached a maximum in about 70 seconds following exposure, with the threshold lowered an average of six db at this point. Further tests on three subjects showed that 'a given tone can sensitize the auditory system to a relatively wide range of test frequencies. Conversely, a relatively wide range of exposure frequencies can sensitize the auditory system to a given test tone.' Maximal sensitization was produced by a frequency of approximately 200 cps. Contralateral effects were also found. (*W.R.T.*)

JERGER, J. F. Influence of stimulus duration on the pure-tone threshold during recovery from auditory fatigue. *J. acoust. Soc. Amer.*, 27, 1955, 121-124.

This experiment was designed to determine whether the disturbance in normal intensity-time relationships, characteristic of the ear with organ-of-Corti-type hearing loss, could be demonstrated in the normal ear during the course of recovery from auditory fatigue. The results from 12 subjects fatigued by a 110 db thermal noise and tested for threshold shifts for 500, 50, and 5 millisecond tones 'clearly indicate a breakdown in the normal pre-exposure time-intensity relationship.' These results suggest that the normal ear recovering from fatigue and the pathological ear act alike in the way in which energy is integrated over short time intervals. (*W.R.T.*)

LIGHTFOOT, C. AND JERGER, J. F. Cumulative effects of repeated bursts of white noise on threshold for 4000-cps tone pips. *J. acoust. Soc. Amer.*, 26, 1954, 1048-1052.

Temporary threshold shift has been measured by means of 'burst-pip' audiometry. The method consists of successive bursts of noise followed by short test tones, or 'pips.' This study investigates the 'changes occurring in the threshold shifting effect of a short burst of fairly intense noise as the burst is repeated over and over a number of times.' For eight normal listeners thresholds were obtained during several series of 100 burst-pip sequences. Major variables investigated were burst-pip interval and sound pressure level of the bursts. It was concluded that 'the ability of an ear to hear a short pip of 4000-cps tone within the first second after such a burst is diminished with each successive burst . . . .' Burst level was an important determiner of cumulative effect while burst-pip interval played a minor role. Lengthening the repetition cycle from 10 to 20 seconds reduced but did not eliminate the cumulative effect. (*W.R.T.*)

PIKLER, A. G. AND HARRIS, J. D. Channels of reception in pitch discrimination. *J. acoust. Soc. Amer.*, 27, 1955, 124-131.

The authors compare pitch discrimination for the monaural as compared with the binaural case and for a number of other cases including binaural lateralized, phase shifted, and air vs. bone conditions. Data obtained on three or fewer subjects using a variant of the method of constant stimulus differences showed that (1) the two ears of a normal-hearing subject are equally sensitive to pitch change at equal loudness levels, (2) lateralization and phase are irrelevant in pitch discrimination, and (3) air and bone conduction discrimination are equivalent. The authors conclude that it is the loudness of a tone that is the invariant, rather than the intensity. DL findings were shown to be profoundly affected by diplacusis and certain conclusions regarding the concept of diplacusis are formulated. The authors conclude that diplacusis is not altogether a peripheral phenomenon. Some clinical aspects of the findings are discussed. A twenty item bibliography is included. (*W.R.T.*)

POLLACK I. Masking of speech by repeated bursts of noise. *J. acoust. Soc. Amer.*, 26, 1954, 1053-1055.

'The masking of speech by a periodically interrupted white noise was examined over a wide range of noise levels, rates of interruption, and noise-time fractions. To a first approximation, the masking produced by an interrupted noise is a constant fraction of that produced by a continuous uninterrupted noise. The masking produced by an interrupted noise is primarily a function of the interval between successive noise bursts and is relatively independent of the noise-time fraction and the rate of interruption of the noise, except insofar as these determine the interval between noise bursts. The effect of interrupted noise on the loudness of speech was also examined.' (Author's précis)

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THURLOW, W. R. AND SMALL, A. M. (JR.) Pitch perception for certain periodic auditory stimuli. *J. acoust. Soc. Amer.*, 27, 1955, 132-137.

'Results of experiments performed to determine the pitch characteristics of pulsed tones are reported. For most of the experiments, the pulsed tones were produced by passing brief rectangular pulses through band-pass filters. For a carrier frequency of 1000 cps, pitch corresponded most closely to the rate at which the pulses were presented; no pitch corresponding to the carrier frequency was heard. For a carrier frequency of 5000 cps both low and high pitches were heard.' Experiments with masking effects, binaural beats and combined pulse tones are reported. The authors suggest an interpretation of the results in terms of a neural 'sorting' process. (*W.R.T.*)

VAN DEN BERG, JW. Transmission of the vocal cavities. *J. acoust. Soc. Amer.*, 27, 1955, 161-168.

The writer describes the design of a special throat loudspeaker used as a carefully calibrated artificial larynx in a hemilaryngectomized patient. By comparing output of the loudspeaker at the level of the larynx with output between the lips of the speaker transmission curves were obtained as a function of frequency for eleven Dutch vowels. Vowel formant locations were found which were in general agreement with data reported in the literature with the exception that the method revealed more formants for several vowels. It was found that damping was smallest for the lowest formants and in general less than that found from analyzing total modulation. 'The damping is small enough to provide distinctive frequency ranges for the formants of each vowel, but on the other hand large enough to ensure that some of the harmonics of the fundamental tone lie within the range of the resonances.' Constant formants, to be ascribed to specific parts of the cavities, are not found. Twenty-two references are presented. (*W.R.T.*)

VAN DEN BERG, JW. Imitation of Dutch vowels and words by a hemilaryngectomized subject using a throat loudspeaker as a pseudolarynx. *J. acoust. Soc. Amer.*, 27, 1955, 169-172.

A specially constructed throat loudspeaker (described in a previous article) was used as an artificial larynx in the throat of a hemilaryngectomized patient. A 'laryngeal tone' of known harmonic composition was shaped by the subject into Dutch vowels and words which were then subjected to harmonic analysis and the judgment of experienced listeners. The results showed that formant regions were comparable to those found in a previous experiment on the transmission of the vocal cavities, and that the vowels were 'natural' as judged by Dutch listeners. It was concluded that 'all vowels can be produced by one volume velocity spectrum . . .' but that this is not necessarily true. The author believes that the larynx can act to suppress higher harmonics, and ascribes this action to the 'correct shaping of the Sinus Morgagni.' A decay of the harmonics with a power of –2 of their number is suggested as the most effective laryngeal spectrum. (*W.R.T.*)

WERTHEIMER, M. The variability of auditory and visual absolute thresholds in time. *J. gen. Psychol.*, 52, 1955, 111-147.

This study attempted to answer the question, 'Do thresholds of different modalities vary concomitantly during the normal waking state?'. Monaural thresholds for clicks and absolute binocular thresholds for white light were measured daily at one and one-half hour intervals. The clicks were presented in groups of four with a 2 db difference between clicks. The subjects indicated on a voting board how many clicks they heard. The visual measurements utilized a similar voting method for the subjects to indicate if they saw a test patch. Test results indicated that there was a good deal of inter- and intra-subject fluctuation from day to day. The auditory threshold did not appear to vary much within an hour. It was concluded that there is probably no correlation between auditory and visual absolute thresholds. (*J.J.O.*)

ZWISLOCKI, J. Factors determining the sound attenuation produced by earphone sockets. *J. acoust. Soc. Amer.*, 27, 1955, 146-154.

'The factors that determine the sound attenuation provided by earphone sockets are analyzed on the basis of experimental evidence, and an attempt is made to determine the practical limit of sound attenuation attained by earphone sockets, when comfort and sound transmission from the earphone to the ear are taken into consideration. For frequencies below 700 cps the attenuation is limited by the mass of the system and the

impedance of the flesh under the earphone cushion. For frequencies above 700 cps bone conduction is the determining factor.'

(Author's precis)

ROSEN, S. AND BERGMAN, M. Mobilization of the stapes for otosclerotic deafness. *Arch. Otolaryng., Chicago*, 61, 1955, 197-206.

A new technique for mobilization of the ankylosed footplate of the stapes is described. The stapes is exposed through the external auditory canal by folding the lower half of the drum membrane upward upon itself. A specially curved, narrow 'mobilizer' is used to put downward pressure on the neck of the stapes until it is mobilized 'sometimes with an audible crack.' Fourteen cases are presented with before and after audiograms. The authors state that 'audiologic evidence indicates that hearing improvement . . . . has already been maintained for periods up to two years.' (*W.R.T.*)

SCHNEIDER, D. Revision of the Miot technique in mobilization of the ossicle system. *Arch. Otolaryng., Chicago*, 61, 1955, 207-211.

The author presents a critique of the Rosen method for mobilization of the stapes in the treatment of otosclerosis. Suggestions for improvement of the technique are made, based upon the author's own theory of a 'dual' hearing system. (*W.R.T.*)

EMERY, R. M. Is there a hard-of-hearing child in your class? *Instructor*, 135, 1955, 38, 85.

The author, instructor in hearing therapy, public schools, Lynn, Massachusetts, describes for teachers' information some of the problems of the hard-of-hearing child. Characteristic behavior is illustrated. Certain classroom considerations are listed in detail. (*J.P.*)

FIBUSH, E. W. The problem of hearing loss. *Soc. Casewk.*, 36, 1955, 123-130.

Hearing impairment resulting in communication handicap causes frustration resulting in a blow to ego strength and self esteem. Adjustment to the hearing loss is dependent upon the individual's acceptance of the problem, his defense mechanisms, his habitual ways of handling his basic emotional needs, and his level of emotional maturity. Social casework techniques already developed in working with other types of emotional problems can be used effectively with the hard of hearing. (*M.R.*)

FUSFELD, I. S. The academic program of schools for the deaf. *Volta Rev.*, 57 (2), 1955, 63-70.

An attempt to evaluate the immediate outcome of programs offered by American schools for the deaf. The Stanford Achievement Test, Advanced Battery, Form J, was administered to 134 students in 1953, to 146 in 1954, representing 33 residential schools for the deaf. Average combined age for the two groups was 19 years. All were candidates for admission to the Preparatory Class of Gallaudet College.

Results: Average achievement level was grade 9. Relatively high strength was displayed in language and spelling, pronounced weakness in paragraph and word meaning. Written discourse reflected a general poverty of vocabulary command and lack of grammatical sense. (*F.B.R.*)

GETZ, S. B. A psychological aid in the diagnosis of deafness of emotional origin. *Arch. Otolaryng., Chicago*, 61, 1955, 217-219.

The author reports six cases of non-organic hearing loss in boys attending a school for the deaf. Two phenomena are said to be associated with these cases. The first phenomenon is that the non-organic cases present more severe behavior and learning problems than the organically deaf. The second phenomenon is the grossly disturbed drawing of a human figure in the 'Draw a Man' test. The author concludes that this test should be used in addition to the standard audiometric procedures.

(*W.R.T.*)

HANLEY, C. N. AND PALMER, J. M. Development of an audiology conference. *West. Speech*, 18, 1954, 237-240.

Advantages of a conference including pediatric, speech, psychological, audiological, and social work services are discussed with respect to both medical and audiologic training, service to aurally handicapped children, integration of community service agencies, and research into etiology and therapeusis of childhood hypacusis. A case seen at the first conference is reported. (*M.R.*)

UDEN, A. V. Sound perception and breath control. *Volta Rev.*, 57 (2), 1955, 61-62.

This article describes an experiment in the Netherlands to test the efficiency of an electrical wind instrument designed for use with deaf and severely hard of hearing children. Two groups of deaf children be-

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tween the ages of 12-14 were matched for I.Q. and musical development. Six melodies were presented for learning, one group using the new wind instrument, the other group using an organ. Results, presented in percentages, indicated greater successes with the wind instrument. Implications for auditory training are discussed. (*F.B.R.*)

LEBERFELD, D. T. AND NERTZ, N. A home training program in language and speech for mentally retarded children. *Amer. J. ment. Def.*, 59, 1954, 413-416.

The authors discuss a home training program that was used to fill in between initial examination and the initiation of actual therapy. The program included activities which would encourage greater rapport between parents and child, oral stimulation exercises, chewing and sucking exercises, and work with pictures and books. Also included were exercises that dealt with concepts of direction, counting, sorting, and matching. The authors report that such a program brought about notable gains in specific abilities. (*J.J.O.*)

SCHNEIDER, B. AND VALLON, J. The results of a speech therapy program for mentally retarded children. *Amer. J. ment. Def.*, 59, 1954, 417-424.

The authors describe a speech-language program which is based on three diagnostic categories. These categories are (1) delayed language development, (2) insufficient language development, and (3) articulatory disturbances. Within the first two categories therapy could develop through a series of graduated levels. Progress was judged on the basis of movement from one level to another. It was found that neither the degree to which a sound was defective nor the degree of difficulty inherent in its production had any appreciable influence on the degree of progress achieved. The program resulted not only in speech-language improvement, but also in improvement in emotional and social levels. The authors suggest that prognosis for such therapy can not be based on IQ or level of intellectual function alone. (*J.J.O.*)

BLUMBERG, M. L. Respiration and speech in the cerebral palsied child. *Amer. J. Dis. Child.*, 89, 1955, 48-53.

The author reviews pertinent points on physiology and neuroanatomy of respiration and relates certain speech problems of the cerebral palsied to irregular respiratory functioning and control. Observations of a group of 27 cerebral palsied children (13 spastics, 12 athetoids, two ataxics), ages two and one-half to 12, are reviewed. It was indicated that athetoid children have poorer respiratory control and, therefore, poorer speech than do spastic children, largely because the former have damage to the hypothalamic respiratory regulating centers and the latter usually do not. The two-fold purpose of respiration training is stated as developing proper usage of the 'bellows apparatus' and the increase of pulmonary tidal volume and vital capacity. Techniques for respiration training are presented. (*F.L.D.*)

BYERS, R. K., PAINE, R. S. AND CROTHERS, B. Extrapyramidal cerebral palsy with hearing loss following erythroblastosis. *Pediatrics*, 15, 1955, 248-255.

The report concerns 23 patients with cerebral palsy believed due to neonatal erythroblastosis who are part of a larger group of 400 patients with cerebral palsy seen in follow-up study. Hearing loss, while present in the great majority of these patients, though often not obvious, has been thought due to pigment disposition with loss of cell population in the cochlear nuclei. Tables are given showing hearing status, group composite audiogram, mental status, and physical status of studied patients. (*J.P.*)

GILLETTE, H. E. Preschool training for cerebral palsy. *Arch. phys. Med.*, 36, 1955, 31-34.

The author briefly reviews the six phases of training—parental, social, speech, motor, sensory, and conceptual—around which a child's future education and occupation are built. It is emphasized that habit patterns in each phase are set in the preschool years and can only rarely be altered in subsequent periods. (*F.L.D.*)

KORTEMEYER, J. Parent instruction and home programs for the cerebral palsied. *Phys. Ther. Rev.*, 35, 1955, 125-127.

The author presents the rationale and outline of parental instruction for a home program with cerebral palsied children.
(*V.B.C.*)

LAMM, S. S. AND FISCH, M. Intellectual development of the cerebral palsied children as a factor in therapeutic progress. *Amer. J. ment. Def.*, 59, 1954, 452-457.

A team of therapists, including a speech therapist, rated 99 cerebral palsied children

as to amount of improvement over a period which varied from six to 14 months. A five-point rating scale was employed. The majority of the cases were rated as showing slight improvement with mildly involved cases showing the greatest improvement. With respect to diagnostic categories, 60 per cent of the spastic group showed moderate to high progress while 77.8 per cent of the athetoids and 44.4 per cent of the ataxics showed improvement. When a comparison was made between the progress and no progress group, it was found that the mean IQ of the former group was 22 points higher than for the latter group. (*J.J.O.*)

WARD, M. M. Group therapy for eleven preschool cerebral palsied children. *J. except. Child.*, 21(6), 1955, 207-214, 230.

This article discusses how group therapy for preschool cerebral palsied children, by means of the team approach, can make possible realistic guidance and planning. The program was planned to include individual evaluations, instruction in cerebral palsy modalities, habilitation, and speech therapy, and at the same time to meet the needs of health supervision, socialization, group psychology by parents for parents, and a screening device for entrance to cerebral palsy classes. (*V.I.R.*)

NIELSON, J. M. Cerebral association mechanisms. *Phys. Ther. Rev.*, 35, 1955, 26-28.

The author discusses the various cerebral association mechanisms in relation to the lobes of the brain in which they occur. Also discussed is the order of recovery of function after complete aphasia and the factors which are important in such recovery. (*J.J.O.*)

ELDRED, S. H., HAMBURG, D. A., INWOOD, E. R., SALZMAR, L., MEYERSBURG, H. A., AND GOODRICH, G. A procedure for the systematic analysis of psychotherapeutic interviews. *Psychiatry*, 17, 1954, 337-345.

Tape recordings were made of 18 psychotherapeutic interviews. Five therapists listened to the recorded interviews. Initial attention was directed toward a study of specific, circumscribed segments of the interviews in an effort to develop criteria of evaluation. It was decided to utilize drastic changes of subject matter as the criterion measure. Five categories of this phenomenon were then studied, (1) direction of change, (2) awareness of change, (3) initiator of change, (4) techniques of change, and (5) causes of change. A total of 58 changes were isolated and evaluated. It was found that changes in subject matter led to more direct communication and that such changes were consciously performed three times as often as they were unconsciously performed. Patients made such changes 2.6 times as often as therapists and such changes led to more direct communication than did changes initiated by the therapist. (*J.J.O.*)

HUDDLESTON, O. L. AND CARPENTER, E. Use of speech therapy in physical medicine. *Arch. phys. Med.*, 36, 1955, 18-25.

This article is a brief review of neuromuscular reeducation and speech training techniques employed with a variety of cases (cerebral palsied, bulbar and bulbo-spinal anterior poliomyelitis, multiple sclerosis, etc.) at the California Rehabilitation Center. The approach is based upon neurophysiological principles, which 'depend upon resistive exercises and reinforcement consisting of the use of maximum voluntary effort exerted against a strong external resistive force.' Special speech instruments used in resistive exercises are described. Two case reports are presented. (*F.L.D.*)

LIDDELL, D. AND NORTHFIELD, D. The effect of temporal lobectomy upon two cases of an unusual form of mental deficiency. *J. Neurol. Psychiat.*, 17, 1954, 267-275.

Case reports of two right-handed adolescents who had experienced head trauma followed by severe mental deterioration are presented. Temporal lobectomies were performed, one on the left and the other on the right. Behavior became less deviant and I.Q. gains were noted.

Both cases had a residual of monotonous voice quality with loss of natural cadence. More severely disturbed emotional development than intellectual development is cited as a possible explanation. (*V.B.C.*)

ROBERTSON, R. AND PILLARD, C. Decerebrate state in children and adolescents. *J. Neurosurg.*, 12, 1955, 13-17.

A comparison is made of 13 adults and 13 children who had experienced decerebrate rigidity from a variety of intercranial lesions. Return to a normal neurological state was observed in six of the children but in none of the adults.

While mortality rates for the two groups are reported similar, the authors conclude

that recovery appeared more favorable if the patient were in the age range 4-15. (*V.B.C.*)

LUBAN, J. Speech and the cleft palate patient. *Amer. J. Orthodont.*, 41, 1955, 121-136.

The characteristics of normal and cleft palate speech are discussed with emphasis on the importance of the velopharyngeal closure. The surgical and prosthetic procedures involved in cleft palate rehabilitation are described and correlated with some of the recent research findings. The value of prosthetic speech aids is stressed. (*G.H.S.*)

ABRAHAMSEN, D. Status of mental hygiene and child guidance facilities in public schools in the United States. *J. Pediat.*, 46, 1955, 107-118.

Report is made of the research project started in 1950 at Columbia University Department of Psychiatry to ascertain how many and what kind of child guidance clinics and mental health facilities exist in public and private schools in the United States. Some findings of this national survey are broken down to show regional trends. (*J.P.*)

COBB, K. Selected references on preschool and parental education. *Elem. Sch. J.*, 55, 1955, 351-358.

One hundred twenty-one bibliography listings and short abstracts on preschool and parental education are given covering the period from December 1953 to December 1954. The following classes of books and articles have been excluded: (1) foreign-language publications, (2) textbooks and reviews, and (3) popular articles containing little new material. (*J.P.*)

CRUIKSHANK, W. M. New horizons in education of the handicapped child. *Amer. J. Publ. Hlth. & Nation's Hlth.*, 45, 1955, 306-311.

Five new and major trends in education of the handicapped child are discussed: (1) early discovery and early admission to an educational program; (2) integration of the handicapped with the non-handicapped; (3) realization of need for honest diagnosis and honest prognosis; (4) continuous guidance and parent education; and (5) emphasis on adequacy of the preparation of teachers of the handicapped. (*F.L.D.*)

DOUGLASS, R. Disruptions in a child's communication. *West. Speech*, 18, 1954, 241-243.

A case report illustrates the author's hypothesis that fear of expression due to lack of acceptance by parents interferes with good speech development. The relationship between accepting and understanding a child's feelings and self-expression and communication is discussed as well as some situations which create parental problems in acceptance and understanding. (*M.R.*)

DREIKURS, R. Emotional predispositions to reading difficulties. *Arch. Pediat.*, 71, 1954, 339-353.

The author expresses the point of view that reading difficulties, like most academic difficulties, express an emotional and social maladjustment of the child. Goals of disturbing behavior discussed in terms of reading problems are (1) attention getting, (2) power, (3) revenge, and (4) display of incompetence. Also discussed is the feeling that corrective measures should not be limited to the area of deficiency but should include the larger issues and the psychological dynamics underlying it. (*J.P.*)

JEFFREY, W. E. New technique for motivating and reinforcing children. *Science*, 121 (3141), 1955, 371.

A motivation technique used with some success in speech correction and in work with mentally retarded children is described. Entertaining children's records are transferred to tape. A delay interval timer is placed in an earphone circuit. Material on tape cut off at preset intervals can be restarted by touch of button, presumably under control of child, but actually controlled by the clinician with a hidden foot lever. (*F.B.R.*)

MORTON, R. B. An experiment in brief psychotherapy. *Psychol. Monogr.*, 69(1), 1955, 1-17.

The purpose of this study was to evaluate the results of brief psychotherapy.

Twenty matched pairs of seriously maladjusted university students were selected to make up an experimental and a control group. During a specified period the control group received no psychotherapy. During the same period the experimental subjects were seen for two or three appointments, totaling from four to seven hours per subject. Brief psychotherapy, consist-

ing of a systematic theoretical orientation, and utilizing vehicles appropriate to Rotter's Social Learning Theory of Personality, was followed.

On the basis of his experiment, the author assumes that significant improvement in adjustment will result from brief psychotherapy. (*P.W.N.*)

MURPHY, A. T. Counseling students with speech and hearing problems. *Personnel & Guidance J.*, 33, 1955, 260-264.

The appropriate treatment for psychogenic speech or hearing problems is client-centered counseling. Direct therapy augmented by supportive counseling is recommended for problems which are basically organic. With diffuse problems it is necessary to judge whether the speech or the general behavioral maladjustment is the major problem. A direct informational approach may be used when there is no emotional subsoil basic to the problem. Illustrative case material is given. (*M.R.*)

PRATT, E. T. Only constructive correction is salutary. *Amer. Childh.*, 40, 1955, 22-23.

The author appeals to parents and teachers for corrective techniques to be selective, constructive, and rooted in justice. Some suggestions are expanded for the examination of motives and methods of corrective behavior. (*J.P.*)

ROGERS, L. A comparison of two kinds of test interpretation interview. *J. Couns. Psychol.*, 1, 1954, 224-231.

A comparison of test-centered counseling with self-evaluative counseling was made with 84 college freshmen. The authors report neither method was more effective with college groups which included a wide range of intelligence. Intelligent students who participated actively were more likely to profit from the self-evaluative method.

(*B.S.S.*)

MARTIN, C. Developmental interrelationships among language variables in children of the first grade. *Elem. Engl.*, 32, 1955, 167-171.

Measures of language development including reading readiness, reading achievement, writing quality, drawing, motor control and three measures of oral language were obtained for one hundred children at the beginning and end of the first grade.

Intercorrelations showed (1) negligible relationship between oral language and reading readiness and reading achievement, (2) negligible relationship between all measures of oral language and writing and reading at the end of the first grade, (3) no relationship between fine motor skills and reading readiness, reading achievement, and oral language, (4) no relationship between drawing and oral language but a small relationship between drawing and the other variables, and (5) growth in each language variable was unrelated to the other variables.

Conclusions from case studies of fourteen children at the extremes were that success in reading could not be predicted from oral language ability, good writers might be poor in both oral language and reading, and good readers were poor writers. (*M.R.*)

SCHOFIELD, R. F. Some thoughts on oral language. *Elem. Engl.*, 32, 1955, 94-97.

Eight activities are listed which provide opportunities for improvement of oral language. Criteria for good oral language lessons and evaluatory techniques are discussed. A check list for evaluation of lessons is presented. (*M.R.*)

WEBB, S. C. Studies of scale and ambiguity values obtained by the method of equal appearing intervals. *Psychol. Monogr.*, 69(3), 1955, 1-20.

This monograph presents a series of studies which provide additional data concerning some aspects of the method of equal-appearing intervals which has been widely used in constructing attitude scales.

Specifically, data are provided concerning the following six topics: (1) efficiency and reliability of estimators of scale and ambiguity values, (2) interactive effects of number of judges, number of intervals, and efficiency of estimating formulae on the reliability of scale and ambiguity values, (3) intercorrelations for scale and ambiguity values, (4) effects of number of judges, number of intervals, and efficiency of estimating formulae on the relation between scale and ambiguity values, (5) relation of scale and ambiguity values obtained by the procedures of this study to the values obtained by Thurstone and Chave, and (6) relevance of scale and ambiguity values for selecting items for Guttman-type scales.

(*P.W.N.*)

SORTINI, A. J. Twenty years of stuttering research. *J. except. Child.*, 21(5), 1955, 181-183, 196.

This article is a report on the types of re-

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search in stuttering; it is based upon a review of *Psychological Abstracts*, 1932 to 1953. (*V.I.R.*)

ILLINGWORTH, R. S. Crying in infants and children. *Brit. med. J.*, 1(4905), 1955, 75-78.

This review of part of the none-too-abundant literature on crying answers such questions as 'how soon does a child cry?' 'how does he cry?' and 'what type of cry can be recognized?' The common causes of crying in the first three months, the older baby, and the older child are summarized, as well as ideas that have been advanced regarding the management of crying.

(*F.L.D.*)

News And Announcements

Members of ASHA are invited to submit material for publication in this department to the editor or one of the staff members of News and Announcements. The deadlines for the four issues of the *Journal* are December 1, March 1, June 1 and September 1. The section, 'News About People' has been discontinued; the membership of the Association is now so extensive that it is impossible to do justice to such items within the scope of this department. Personnel information which appears to be of wide interest to the membership will be placed in the general section of News and Announcements.

The development of a new section in this department is under way. Material to be presented may be classified as 'Significant Trends Related to the Profession.' Such topics might include trends in research; state licensing; the spread of speech and hearing facilities to new areas; the analysis of our membership in terms of such factors as age, sex, degrees, types of positions occupied; or increase in number of degrees received in recent years. Members of the profession who are supervising M.A. and Ph.D. candidates in their research are in a strategic position to obtain information for feature articles for this section. Author's names will be attached to such articles when submitted for this department. Contributions and suggestions will be welcomed.

A new publication called *Noise Control* has been announced by the Acoustical Society of America, its sponsor. The new bimonthly journal, the first issue of which was released in January 1955, is designed for the reader who has practical noise problems. It is well illustrated, articles are as short as possible, with mathematics held to a minimum. Advanced technical knowledge of acoustics is not necessary for adequate understanding of the contents. The editor of Noise Control is Lewis S. Goodfriend, and his editorial board is composed of Floyd A. Firestone (chairman), Leo L. Beranek (vice chairman), Herbert A. Erf, Robert O. Fehr, Karl D. Kryter, and Haldon A. Leedy. Editorial inquiries and manuscripts should be addressed to the editor, Noise Control, 57 E. 55th Street, New York 22, New York.

The Scientific Manpower Commission has called attention to a recent presidential directive that should put an end to the uncertainties that have hampered graduate study for the past 16 months. In accordance with the directive, college students receiving the bachelor's degree may anticipate deferment for graduate study provided they have attained a grade of 80 and are in the upper quarter of the graduating class. Chances of deferment will be still further improved if the student has been accepted in an accredited graduate school. Once embarked upon graduate study, the student can expect continued deferment until he has completed work for the next higher degree; his status may not be reviewed during this period. For the master's degree he will be allowed two years beyond the bachelor's and for the doctor's degree, three years beyond the master's. He must maintain a satisfactory scholastic record.

Lawrence J. Linck, one of the country's best known leaders in the health and welfare field, has resigned as executive director of the National Society for Crippled Children and Adults. Pending appointment of a new executive director, Mr. Linck will remain in his present post in Chicago. Mr. Linck's resignation climaxes a ten-year record of achievement marked by phenomenal growth in the number of crippled children helped and the kinds of professional services made available to them. The development and expansion of many speech and hearing programs throughout the nation would not have been possible without the encouragement and assistance of the National Society for Crippled Children and Adults under Mr. Linck's enlightened guidance.

News and Announcements is edited by Mary W. Huber, Los Angeles State College, assisted by the following committee: Sue Earnest, San Diego State College; Severina Nelson, University of Illinois; Max Nelson, Michigan State College; Henry M. Moser, Ohio State University; and Lester L. Hale, University of Florida.

Dr. Emmett Albert Betts has resigned from the directorship of the Reading Clinic at Temple University which he established in 1945. Dr. Betts is now Director of the Betts Reading Clinic, Haverford, Pennsylvania, where he will continue his clinical, consulting, and research activities. Beginning in 1955, Dr. Betts and his associates will conduct one-week institutes in different regions of the United States.

The A.M.A. Archives of Otolaryngology announces the establishment of a section devoted exclusively to Audiology. The editor will consider for publication worthwhile articles related to any aspect of Hearing. Investigators are invited to submit articles for publication to Dr. George M. Coates, Chief Editor, or Dr. Joseph Sataloff, Associate Editor of the Audiological Section.

The California School for the Deaf at Berkeley has enlarged its services program to include differential diagnosis in conditions of language retardation or language disturbance; i.e., hearing loss, aphasia, brain damage, mental retardation, and emotional disorders. This is in addition to its program of psychological and audiological examination of the deaf and the hard of hearing.

The University of California Medical Center at Los Angeles, which opened in May, 1955, provides speech therapy through the Out-Patient Department. Emphasis is placed on those problems pertaining to hearing, laryngectomy, and cleft palate.

The United Cerebral Palsy Association of Los Angeles now sponsors five pre-nursery school units in the Los Angeles area for children from 18 months to 3 years of age.

Dr. Kenneth O. Johnson has been appointed Chief of Audiology and Speech Correction for the Veterans Administration in Washington, D. C. Prior to going to Washington, Dr. Johnson was director of the Speech and Hearing Clinic at the Veterans Hospital in San Francisco and held a clinical appointment on the staff of the Department of Otolaryngology, University of California School of Medicine.

Crayton Walker, who has an M.A. in the field of Speech and Hearing and is a member of ASHA, has been appointed executive director of the American Hearing Society. Since 1949, Mr. Walker has been administrative assistant to the chief, Division of Maternal and Child Health, and supervisor of the Hearing and Vision Conservation Program, Ohio Department of Health. He assumed his new administrative duties in the American Hearing Society, March 1, 1955.

Dr. Wendell Johnson, State University of Iowa, working under a research professorship, devoted the 1955 spring semester to preparing reports on a four-year stuttering research program that was conducted under a grant from the Hill Family Foundation.

Miss Mary E. Switzer, Director of the Office of Vocational Rehabilitation, Department of Health, Education, and Welfare has announced that OVR, on recommendation of the National Advisory Council on Vocational Rehabilitation, has approved a grant of $27,800 to the New York State Psychiatric Institute for establishing a mental hygiene clinic for deaf adolescents and adults. The Institute will operate in three important mental health areas for deaf people—research, service, and training of others to serve as mental hygiene workers for the deaf. Dr. Franz J. Kallmann of Columbia University will direct the work.

The twenty-seventh observance of National Hearing Week took place May 1-7 with the endorsement of President Eisenhower, eight members of his Cabinet, and other Federal Government officials interested in the problems of an estimated 15 million Americans with some degree of hearing loss. National Hearing Week is sponsored annually by the American Hearing Society. The purpose of the campaign is to inform the public about facilities available to the hard of hearing and to stress the need for expansion of such services.

The Tulane Speech and Hearing Center has initiated a lecture-discussion series based on the problems and interests of parents of young deaf children. The first program in the series featured a talk on 'Causes of Deafness in Young Children,' and the second program presented was on 'Accepting the Deaf Child.' The third program will be concerned with 'Normal Development of the Young Child,' and will be presented by Dr. D. W. Van Gelder, Assistant Professor of Pediatrics at Tulane.

Leo G. Doerfler, Professor of Audiology, University of Pittsburgh, has been appointed a member of the Noise Committee of the American Industrial Hygiene Association. This committee has been engaged for some time in the preparation of a noise manual for industrial hygienists.

The Rauh Nursery for Preschool Deaf Children, a joint activity of the University of Pittsburgh Department of Audiology, the Department of Public Health of Pittsburgh, and the Pittsburgh Section of the National Council of Jewish Women, is in its third year of operation. Opportunity is provided for integration of the deaf children with hearing children in the regular nursery carried on under the auspices of the School of Medicine and supervised by Dr. Benjamin Spock.

A unique experiment in the testing of hearing of 500 three and four year old children is underway in Denver in an effort to decrease problems caused by poor hearing. The children are being selected at random to form a pilot group to determine the simplest and most effective method of testing young children's hearing. If proved effective, the plan will be implemented by the Denver Public Schools. Members of the Junior League of Denver have provided funds for the project and various members of the Otolaryngologist's Society are acting as advisors in the undertaking.

Stanford University has organized a new program in English language training for foreign students, which combines in one course both the written and oral aspects of the training. It is felt that in this way the training will be better coordinated and that the student will be better able to function effectively in all phases of communication in English. The series of courses is under the Department of Speech and Drama with Dr. Dorothy Huntington of the Speech and Hearing Clinic staff in charge.

The Army Daughters has joined the Junior League and the Peninsula chapter of Kappa Alpha Theta in sponsoring the Stanford University Speech and Hearing Clinic. The Army Daughters volunteer their time and services in working at the Clinic and in the preparation of teaching and clinical materials.

The united Cerebral Palsy of Peninsula Cities is sponsoring a service and training project at the Stanford Speech and Hearing Clinic this year. The project involves therapy for some fifteen cerebral palsied children and the addition of a new staff member to direct the program and teach a special course dealing with speech and language problems in cerebral palsy.

The Department of Speech and Hearing at Gallaudet College, Washington, D. C., is proving to be one of the most important new units. Dr. Elizabeth Van Luven, Associate Professor of Education in charge of this work, is one of the nine new members recently added to the staff. At present, the Department offers speech, lip reading, and acoustic training as required courses for all preparatory and freshman students. Facilities include two sound conditioned speech rooms and ten individual sound conditioned booths. Growth plans, now underway, include additions to the staff, more physical space, and additional audiometric equipment.

Professor Grant Fairbanks, Newman Guttmann, and Murray Miron are engaged in work on a research contract with the Air Force for study of listening comprehension as a function of time compression.

The Speech and Hearing Center at Adelphi College will conduct its second Summer Workshop in Speech Pathology, July 6-August 12, 1955. The Workshop theme is *Learning Theory, Language and Speech Pathology*. The program emphasizes a theory of learning based on clinical research and experimentation and applies the theoretical data to problems of stuttering, aphasia and delayed speech. Six graduate or undergraduate credits may be earned. For information write to Franklyn Elliott, Director, Speech and Hearing Center, Adelphi College, Garden City, New York.

A special program featuring training in hearing and aural rehabilitation is being planned for the summer session at Stanford University in an eight week session. For information write to Dr. Hayes Newby, Associate Director, Speech and Hearing Clinic, Stanford University.

A workshop on Individual Differences in Elementary and Secondary School Children will be held at the Catholic University of America in Washington, D. C., June 10-21, 1955. Directed by the Rev. William F. Jenks, the workshop will include lectures on the mentally retarded, remedial reading, emotionally disturbed, cerebral palsied and other pertinent topics. The workshop will be followed by a summer course for teachers of the partially seeing and the blind, June 27-August 6, 1955.

Among the offerings of the Northwestern University summer session for 1955 are four special courses in audiology: Psychology of Deafness, Industrial and Community Programs in Audiology, Aphasia and Related Language Disturbances and, a Symposium on Speech and Language Problems Related to Neurological Damage. Students may enroll for a six-week session, June 20-July 30 or an eight week session, June 20-August 13. For information, write to Raymond Carhart, Professor of Audiology, Northwestern University, Evanston, Illinois.

The Hearing and Speech Center of Syracuse University will conduct a Summer Residence School for Children with Hearing and Speech Problems, July 5-August 14, 1955. Registration is by prior application only. For additional information, write to Gordon D. Hoople, Hearing and Speech Center, Syracuse University, 805 S. Crouse Avenue, Syracuse 10, New York.

The University of Southern California will feature a graduate symposium in speech correction for practicing speech therapists with Verna Breinholt as instructor. Guest lecturers will highlight this course. For further information write to Dr. Victor P. Garwood, Assistant Director. Speech and Hearing Clinic, University of Southern California, Los Angeles, California.

The practice of including children with 'special' needs in normal school situations will be examined in all its aspects by elementary and nursery school teachers in a four-week summer workshop program to be presented by Pacific Oaks Friends School, Pasadena, California, and Occidental College, Los Angeles. Director of the workshop will be Clarine Manshardt, Director of Education, Temple City, California Unified School District. Funds for the study of this growing practice have been provided in a grant from the Rosenberg Foundation of San Francisco, an organization dedicated to aiding the welfare of children and youth in the state of California. Study groups will meet daily June 27-July 22. For further information write Pacific Oaks Friends School, 714 W. California Street, Pasadena 2, California.

Long Beach (California) State College is featuring a workshop in Speech Correction, June 27-July 22, 1955, designed to offer practical help to the classroom teacher and certified speech consultant. Particular attention will be devoted to methods of handling stuttering, delayed speech, cleft palate speech, and parent counseling. For further information address: Mr. Ned Bowler, Speech Department, Long Beach State College, 6201 East Anaheim, Long Beach, California.

College of the Pacific will conduct a Speech and Hearing Resident Clinic for Children and Adults, June 27-August 19. Children will live on campus for the eight week period. Write Dr. Howard Runion, Speech Department, College of the Pacific, Stockton, California.

San Jose State College will offer beginning and advanced courses in remedial speech and directed teaching of speech correction and mental hygiene during the 1955 summer session. There will also be workshops and guest lecturers. Write Ward Rasmus, Director, Speech and Hearing Center, San Jose State College, San Jose, California.

Summer session courses offered at the University of Buffalo will include 'Speech Problems in the Classroom' and 'Advanced Courses in Therapy for Stuttering.' Dr. Charles Van Riper will be consultant on August 4th and 5th for the course on stuttering therapy. The university will also conduct three out-patient clinics under the supervision of Dr. Katherine F. Thorn, July 5-August 12. These clinics will serve stutterers, young children with articulatory defects, and individuals with cleft palate speech.

The Speech and Hearing Clinic of the Pennsylvania State University and the Penn-

sylvania Society for Crippled Children and Adults will co-sponsor the Eighth Annual Speech and Hearing Symposium to be held June 20-July 1 at the University. From June 20 to June 24, the symposium will feature Shulamith Kastein of the Presbyterian Hospital in New York City and Eugene McDonald on Cerebral Palsy. From June 27 to July 1, James Frick, Phillip Glasner, Dean Williams, and Eugene McDonald will discuss various aspects of stuttering.

The speech program at Camp Jened in Hunter, New York has been approved by the Bureau for Physically Handicapped Children of the New York State Department of Education. The camp is entering its third year and provides a program of summer camping integrated with special services for handicapped children and adults. For information on Camp Jened write to Leona S. Burger, 1434 Genesee St., Utica 4, New York.

The Hospital-School for Severely Handicapped Children in Iowa City will hold the Annual Cerebral Palsy Workshop July 11-29, 1955. The workshop is broad in scope, but limited in registration. For information write Dr. R. R. Rembolt, Director, Hospital-School for Severely Handicapped Children, Iowa City, Iowa.

The Massachusetts Institute of Technology will again present a two-week special summer program in Noise Reduction beginning August 15. The material will be directed toward the man with a noise problem. Complete information may be obtained from the Summer Session Office, Room 7-103, Massachusetts Institute of Technology, Cambridge, Massachusetts.

The Purdue Speech and Hearing Clinic is planning to have the following speakers during the annual Summer Session Speech and Hearing Therapy Workshop and Children's Clinic program to be conducted July 13-August 1. From the regular Purdue staff, lectures are scheduled by Dr. M. D. Steer, Dr. T. D. Hanley, Dr. George Shaffer, and Professor Frances Parton. Lectures will also be given by Dr. C. Van Riper, Dr. S. R. Silverman, Dr. Ollie Backus and Dr. Jack Matthews.

At the University of Wisconsin four specialized rehabilitation centers will be maintained in conjunction with the Bureau for Handicapped Children and Wisconsin General Hospital. These boarding clinics provide ideal opportunities for students in speech correction to observe and participate in the team approach to problems of diagnosis and therapy. These programs include the Stuttering Clinic, the Cerebral Palsy Center, the Delayed Speech Workshop, and the Cleft Palate Clinic.

Meetings Announced

The International Association of Logopedics and Phoniatrics will hold the 10th International Congress for Speech and Voice Therapy in Barcelona, Spain, September 3-5, 1956. Those who propose to submit papers should notify the Organizing Secretary not later than January 1956. An abstract of not more than one hundred words must be submitted before May 15, 1956. The time limit for papers is ten minutes. The official languages of the Congress are English, French, German and Spanish. For further information write Dr. J. Perello, Provenza 319, Barcelona (9), Spain.

Acoustical Society of America, State College, Pennsylvania, June 30-July 2, 1955.

American Psychological Association, San Francisco, California, September 2-7, 1955.

American Speech and Hearing Association in association with the California Speech Therapy Association, November 17-19, Hotel Statler, Los Angeles. Members planning to bring their families with them when they attend the American Speech and Hearing Association convention will be provided with special information concerning tours, sight seeing trips, and special spots of interest if they notify, in advance, Dr. Victor Garwood, Speech Department, University of Southern California, Los Angeles, California.

Speech Association of America in association with the Western Speech Association, week of December 26, 1955, Hotel Statler, Los Angeles.

The 18th annual University of Chicago Reading Conference will be held June 28-July 1, 1955. The 'Oral Aspects of Reading' will be this year's theme. For detailed information about the Conference and about the Workshop in Reading to be held at the university, July 5-29, write to: Dr. Helen M. Robinson, Department of Education, University of Chicago, 5835 Kimbark, Avenue, Chicago 37, Illinois.

New Materials

Listening Time is a group of four 78 rpm records with five stories written and narrated by Louise B. Scott, with musical accompaniment by Lucille F. Wood. The stories are directed toward incidental use of consonant sounds, with emphasis on listening and relaxation. These records are available through Bowmar Records, 5415 Crenshaw Blvd., Los Angeles 43 for $6. They can also be ordered from Webster Publishing Co., St. Louis.

See, Hear, and Do, a series of 16 films strips in color edited by Louise B. Scott for primary grades and classroom use, places emphasis on consonant sounds. The films are produced by Dr. David J. Goodman, Filmedia, New York City, for Webster Publishing Co., St. Louis. These films come in two packages, 8 each with review strip, at $25 a package.

Speech Ways, handbook for teachers of fourth through sixth grade children, written by Louise B. Scott and J. J. Thompson, presents a guidance approach to oral communication. It may be ordered from Webster Publishing Co., St. Louis.

The Aphasia Screening Tests are again available and may be secured by writing to Dr. Joseph M. Wepman, 950 East 59th Street, Chicago 37, Illinois.

The Stanford University Speech and Hearing Clinic has prepared a mimeographed brochure describing career opportunities in the fields of speech correction and hearing. Free copies may be obtained by writing to the Director, Dr. Virgil A. Anderson, Stanford University, Stanford, California.

Graduate Assistantships, Fellowships and Scholarships

This section, a regular feature of each issue of the Journal, lists part-time graduate appointments, fellowships, and scholarships specifically designated for graduate work in speech and hearing. General university fellowships and scholarships, unspecified as to area of concentration, and full time graduate positions will not be included.

Copy should be submitted to the News and Announcements Editor and should include formal title of appointment, institution, and unit; dates, general duties, and remuneration; name and address of persons receiving application. Deadline for receiving copy is three months prior to the publication date. *Openings will be listed in two successive issues and then will be dropped until a renewal is requested.*

Assistantship. Emerson College. Fifteen hours per week, spent in Hearing Clinic at Children's Medical Center, Boston. Half time. $1,000 for academic year, including remission of tuition. Address Adam J. Sortini, Hearing Clinic, Division of Otolaryngology, Children's Medical Center, 300 Longwood Ave., Boston, Mass.

Associateships and Assistantships. Hearing and Adult Speech Center, University of Denver. Starting June or September 1955. Half-time, $200-300 per quarter; persons to work either in Clinic or in City Institutions in speech therapy, hearing and related special education fields. Graduate load 10-15 hours per quarter, leading to M.A. or Ph.D. degrees. Write to Dr. W. J. Clark, Hearing and Adult Speech Center, Building T-8, University of Denver, Denver 10, Colorado.

Assistantships. University of Virginia. Ten hours per week of clinical duty, in speech correction or audiology. $625 for two semesters. Assistants may complete an M.A. or M. Ed. program in two semesters and a summer. Address J. Jeffery Auer, Chairman, Department of Speech and Drama, University of Virginia, Charlottesville, Virginia.

Clinical Assistantships. The Pennsylvania State University, Speech and Hearing Clinic. Starting September. Clinical work with adult vocational rehabilitation clients or college students. Remission of tuition. Half-time $1180 for ten months; 20 hours per week in

the clinic. Students expected to enroll for eight to ten credits per semester. Quarter-time assistantships $590 for ten months; 10 hours per week in the clinic. Students expected to enroll for eleven to thirteen credits per semester. Address Eugene T. McDonald, Speech and Hearing Clinic, Pennsylvania State University, State College, Pennsylvania.

Graduate Assistantships. Temple University. Twenty hours per week in diagnostic, therapeutic and supervisory services. $900 for nine months. Remission of tuition. Students are expected to enroll for nine hours graduate credit each semester. Address Gordon F. Hostetler, Department of Speech and Dramatic Arts, Temple University, Philadelphia, Pennsylvania.

Clinical Assistantships. Syracuse University, Hearing and Speech Center. Twenty-four hours of clinical work per week. Assistantships in audiology and speech pathology. $1200-$1500 yearly. Remission of six hours tuition. Address Louis M. DiCarlo, Hearing and Speech Center, Syracuse University, Syracuse, New York.

Clinical Assistantships. University of Pittsburgh, Psychology Department Speech Clinic, Speech Department Remedial Speech Program, Audiology Department of Eye and Ear Hospital, Childrens' Hospital Cerebral Palsy Clinic. Half-time assistance is $1,278 for the academic year of two semesters, remission of tuition for nine graduate credits each semester and laboratory and incidental fees.

Research Assistantships. Appointments are granted to individuals who are selected on the basis of their ability to assist in the University of Pittsburgh's program of research in Speech and Hearing Disorders. Appointments are variable as to the nature of the duties, amount of time required, salary, and permission to register for graduate courses. Assistants are required to pay tuition and fees. For further information write to Dr. Jack Matthews, Chairman, Graduate School Committee on Speech and Hearing Disorders, University of Pittsburgh, Pittsburgh 13, Pennsylvania.

Clinical Assistantships. Louisiana State University Speech and Hearing Clinic. Starting September or February. Twelve to twenty hours per week of clinical work with cases. Stipend $810 to $1500 per academic year with waiver of tuition fees. Students may enroll for nine to twelve semester hours of graduate credit each semester. For information write to Dr. C. M. Wise, Head, Department of Speech, Louisiana State University, Baton Rouge, Louisiana.

Clinical and Research Assistantships. The Ohio State University. Speech and Hearing Clinic; Ohio Elks Cerebral Palsy-Aphasia Speech Clinic; Ohio Knights of Pythias Children's Speech and Hearing Clinic; Franklin County Cerebral Palsy Speech Clinic; Ohio State School Speech Clinic. Holders of assistantships devote 25 hours per week and carry 10 hours of graduate study. Stipends for Autumn, Winter and Spring Quarters of the academic year range from $1500 to $1800. Address applications to Professor W. Hayes Yeager, Chairman of the Department of Speech, 205 Derby Hall, Ohio State University, Columbus 10, Ohio.

Graduate Assistantships. The Ohio State University Speech and Hearing Clinic. Graduate assistants work 15 clock hours per week and carry 12 hours of graduate study. Stipends for the Autumn, Winter and Spring Quarters range up to $1200. Address applications to Professor W. Hayes Yeager, Chairman of the Department of Speech, 205 Derby Hall, Ohio State University, Columbus 10, Ohio.

Scholarships and Fellowships in Audiology. The Ohio State University Speech and Hearing Clinic. Available for those doing graduate work in hearing conservation or audiology, which includes audiometry, auditory training, speech reading, and anatomy, psychology, and acoustics of the ear and hearing. The scholarships carry stipends ranging up to $1350 per year; the fellowships carry stipends ranging up to $1800 per year. Both leave the student comparatively free to devote his time to graduate study. Address applications to Professor W. Hayes Yeager, Chairman of the Department of Speech, 205 Derby Hall, Ohio State University, Columbus 10, Ohio.

Fellowship. University of Pittsburgh (in cooperation with Department of Audiology, Eye and Ear Hospital of Pittsburgh). Clinical Fellowship in Audiology. Diagnostic and rehabilitative. 20 hours per week. $1500 for

school year plus possibility of summer appointment. Fellow may carry graduate study program leading to M.S. or Ph.D. in audiology and speech correction. Address Leo G. Doerfler, Department of Audiology, Eye and Ear Hospital of Pittsburgh, Pittsburgh 13, Pa.

Junior Research Fellowships. University of Pittsburgh. Awarded to students who meet the qualifications for graduate student assistants and have demonstrated their capacity for original thought and promise of development as investigators. The Junior Research fellowships carry stipends ranging from $750 to $1,500 with remission of laboratory and incidental fees and a tuition allowance of nine credits per semester for appointees not eligible for other scholarship provisions. The stipend is regarded as an award to the promising graduate student rather than as remuneration for services rendered. Junior research fellows are expected to pursue graduate studies and research on a full-time basis. Write to Dr. Jack Matthews, Chairman, Graduate School Committee on Speech and Hearing Disorders, University of Pittsburgh, Pittsburgh 13, Pennsylvania.

Scholarships. University of Southern California and John Tracy Clinic. $600 each, covering tuition, books, etc. for teacher training program preparatory to teaching the preschool deaf child. Applicants must have junior standing in a recognized teaching institution or a B.A. degree. Scholarship may be extended to a maximum of $1200. Address Victor P. Garwood, USC-JTC Program, University of Southern California, Los Angeles 7, California.

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